

## ROYAL BOTANIC GARDENS, KEW.

## BULLETIN

OF

## MISCELLANEOUS INFORMATION.

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## I. MATERIALS FOR A FLORA OF BRITISH HONDURAS: I.

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The Colony of British Honduras is situated on the eastern slope of Central America, approximately between the parallels of  $15^{\circ} 54'$  and  $18^{\circ} 29'$  north and  $88^{\circ} 10'$  and  $89^{\circ} 9'$  west. It is bounded on the north by the Mexican State of Yucatan, on the west and south by the Republic of Guatemala, and on the east by the Caribbean Sea. Its area is 7562 square miles, the seaboard being about 180 miles [over 200 miles, according to W. R. Dunlop] in length, and the average depth from the coast-line to the western frontier being 40–50 miles. British Honduras is thus slightly larger than Wales, nearly twice the size of Jamaica, and more than four times as large as Trinidad. The population in 1921 was estimated at 45,317 persons, mostly Spanish-American, coloured, or black.

“Although the colony is in the tropics, its climate is sub-tropical. The highest shade temperature recorded is  $98^{\circ}$  F., the lowest  $50^{\circ}$ . Easterly sea-winds prevail during the greater part of the year. The dry season lasts from the middle of February to the middle of May; rain occurs at intervals during the other months, and almost continuously in October, November and December. The annual rainfall averages about  $81\frac{1}{2}$  in., but rises in some districts to 150 in. or more.”\* “The average rainfall at various points is approximately as follows:—Corosal 50 inches; El Cayo 55 inches; Belize 60 inches; Stann Creek (Town) 90 inches; Punta Gorda 150 inches.”† “The mean temperature of Belize in 1888 was  $80^{\circ}$ , the maximum  $92^{\circ}$ , and the minimum  $58^{\circ}$ , giving a range of  $34^{\circ}$  . . . . The mean

\* Encycl. Brit. ed. 11, iv. 615 (1910).

† W. R. Dunlop, Report on the Economic and Natural Features of British Honduras, 2 (1921).

relative humidity is 74° . . . . . Beginning in the morning with 93° or 100°, at mid-day it is only 64° to 62°, giving a range of 38°.”\*

The part of British Honduras bounded on the south by the Northern River “is a dead flat, with the exception of a few small hillocks or ridges and some shallow basins with a very gentle incline from the western frontier to the sea—a plain of about 1000 square miles. There are several lagoons, but comparatively few swamps. The soil is a vegetable mould (humus), some 12 or 18 inches deep, the subsoil being a stony marl . . . . . That portion of the colony lying between the Hondo and a line drawn from Belize to Indian Church embraces a region the formation of which consists of thin surface-soil—the decayed droppings of trees—over a subsoil of indurated marl. The uplands are so far interior that very little of their débris reaches this district, unlike the southern, in which the surface soil is alluvial from the greater contiguity of the high lands. At Indian Church the limestone crops up, and beyond the Hondo the Yucatecan Hills arise. To the west, about Booth’s River, the Bravo, and Blue Creek (tributaries of the Hondo), the marl has a top soil of blue clay under the surface soil. The absence of alluvium and detritus in the northern district is manifestly owing to the slower currents of the rivers.”†

“The southern half of the colony presents a totally different aspect from the northern. Towards the western, and particularly the south-western boundary, the region develops table-land and plateaux. The range of mountains beginning at Sibun and running nearly parallel to the coast, are clothed with verdure to their summits, but at right angles to these are others veiled in mist, rising behind, higher and higher, in amphitheatrical form, whose conical peaks proclaim their volcanic birth. The highest peak in the Cockscomb Mountains, now known as the Victoria Peak, is 3700 ft. above the level of the sea.”† The region between Garbutt’s Falls on the Belize River, at the western frontier, and the sea-coast at Deep River was traversed in 1879 by the Colonial Secretary, Mr. Fowler. “The country proved to be a succession of valleys and hills, from 1200 to 3000 feet above sea-level. The westerly portion was an open undulating grassy country, forming magnificent pasturage lands. Towards the coast it was all forest, which was full of valuable timber.”†

The salient features of the country have been summarized as follows :—“In the north the surface is generally level with wet to swampy soil in places and periodically dry conditions in others; in the former the prevalent formation is clayey dis-integrated limestone, in the latter (which include the so-called “pine-ridges”) almost pure sand overlying Tertiary sandstone. Southwards the country becomes gradually hilly (the hills con-

\* Bristowe and Wright, *Handbook of British Honduras for 1889–90*, 230 (1889).

† Bristowe and Wright, *op. cit.* 16–17.



sisting of metamorphosed sandstone), and south of Deep River there are folded calcareous sandstones, giving rise to fertile rolling country with obvious potentialities for agriculture. The best and most accessible lands lie along the rivers, which flow through deposits of alluvium but are separated by sandy ridges. The northern rivers are generally slow and deep with fairly direct courses, the southern fast-flowing, winding, and shallow."\* For a detailed account of the geology etc. of Northern Central America the reader should refer to Sapper's paper in *Petermanns Mittheilungen*, Ergänzungsheft No. 127 (1899).

Our knowledge of the vegetation of British Honduras is due mainly to the investigations of Sir D. Morris, who paid a short visit to the colony at the close of the year 1882, and embodied his results in "The Colony of British Honduras, its Resources and Prospects," London, 1883—a work now unfortunately out of print. Much additional information is contained in Mr. E. D. M. Hooper's "Report upon the Forests of Honduras" (1887), and Mr. W. R. Dunlop's "Report on the Economic and Natural Features of British Honduras" (1921). According to these authors there are four main types of country, namely mangrove swamps, cohune-ridge, broken-ridge, and pine-ridge. Dunlop mentions the existence of coastal savannahs associated with the mangrove-swamps. Speaking generally, cohune-ridge, broken-ridge and pine-ridge occur as parallel tracts in between the rivers in the following order: river, cohune-ridge, broken-ridge, pine-ridge, broken-ridge, cohune-ridge, river. Hooper states that it is considered that one-third of the country is pine-ridge and two-fifths cohune-ridge, and less than a quarter broken-ridge and coast-swamps, but adds that in his opinion broken-ridge and swamps occupy more than a quarter of the whole area.

#### TYPES OF VEGETATION.

*Mangrove swamps.*—The low coast-line and the numerous cays or coral islands are covered with a dense and almost continuous growth of mangrove trees, which give the country, as seen from the sea, a densely wooded appearance. For a few miles inland the country is low and swampy, with numerous lagoons. The principal trees in the mangrove swamps are Red Mangrove (*Rhizophora Mangle*), Black Mangrove (*Avicennia nitida*) and White Mangrove (*Laguncularia racemosa*). Sapodilla (*Achras Sapota*) and Seaside Grape (*Coccoloba uvifera*) occur on drier elevations. Mahoe (*Paritium tiliaceum*) grows in marshes near the sea, and Buttonwood (*Conocarpus erectus*) is common in swampy places. The Manchineel (*Hippomane Mancinella*) is confined to dry ridges near the sea-shore, and is by no means a common tree.

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\* Geogr. Journ. 1922, lix. 473 (Review of Mr. W. R. Dunlop's Report on British Honduras).

No detailed account of the Mangrove-swamps of British Honduras has been published. According to Harshberger\* the plants of the Mangrove formation of Central America are essentially the same as in Mexico. A sketch of the sea-coast flora of Tabasco was published by Rovirosa in *La Naturaleza*, and reproduced in Ramirez, *La Vegetación de México*, 110, 111 (1899). The characteristic species are *Rhizophora Mangle*, *Okenia hypogaea*, *Chrysobalanus Icaco*, *Coccoloba uvifera*, *Ipomoea pes-caprae*, *Scirpus maritimus*, *Avicennia tomentosa* and *Paritium tiliaceum*; at a short distance are extensive woods largely composed of *Pimenta officinalis* var. *Tabasco* and *Crescentia cucurbitina*. By the sides of lagoons and swamps are trees of *Lonchocarpus hondurensis*, *Haematoxylon campechianum* and *Inga spuria*; among the frutescent and herbaceous plants in the same situation are *Dalbergia campechiana*, *Clerodendron ligustrinum*, *Cassia bicapsularis*, *Malvaviscus arboreus*, *Jacquinia racemosa*, *Paullinia barbadensis*, *Corynostylis Hybanthus*, and *Gynerium saccharoides*. When the lagoons dry up, their beds become covered with herbaceous plants including *Eragrostis reptans*, *Parthenium Hysterophorus*, *Helenium quadridentatum*, *Egletes viscosa*, *Hydrolea spinosa* and *Cardiospermum Halicacabum*. Among the more or less submerged aquatic plants are *Vallisneria spiralis*, *Cabomba aquatica*, *Ceratophyllum demersum*, *Potamogeton fluitans*, *Heteranthera graminea*, *Limnanthemum Humboldtianum*, *Eichornia azurea* and *Nymphaea ampla*. The floating species include *Pistia Stratiotes*, *Jussieuia natans*, *Neptunia oleracea*, *Typha angustifolia*, and the vascular cryptogams *Acrostichum aureum*, *Ceratopteris thalictroides* and *Azolla caroliniana*. These sometimes travel freely before the wind and sometimes occur in association with *Thalia geniculata*, *Ipomoea fistulosa*, *Cyperus articulatus* and *Arundo domingensis*. On alluvial ground the characteristic species are *Pithecolobium ligustrinum*, *Buettneria carthaginensis*, *Muntingia Calabura*, *Sapindus marginatus*, *Trophis mexicana*, *Brosimum Alicastrum*, *Terminalia Buceras* and several species of *Ocotea*.

The littoral flora of Panama appears to be similar, according to Seemann† and Wagner.‡ *Rhizophora*, *Avicennia*, and *Acrostichum aureum* are the principal elements in the vegetation of the mangrove swamps. On the sand of the sea-beach *Ipomoea pes-caprae* grows in wild luxuriance, producing runners often more than 200 feet long. Higher up, where the ground is firmer, are groves of coco-nut palms, Manzanilla trees (*Hippomane Manicella*), and spiny *Prosopis* and *Cereus Pitajaya*, or thickets of *Crescentia cucurbitina* and *Paritium tiliaceum*.

Schimper§ states that the Western Mangrove formation (found on the West African and American coasts) contains four species

\* Harshberger, *Phytogeographic Survey of North America*, 664 (1911).

† Bot. Herald, 65, 66 (1852).

‡ Petermann, *Geogr. Mittheil.* 1863, 280-299.

§ Plant Geography, Engl. ed., 406 (1903).



only: *Rhizophora Mangle*, *Laguncularia racemosa*, *Avicennia tomentosa* and *A. nitida*. *Rhizophora Mangle* occupies the outer edge of the formation, whilst *Laguncularia racemosa* appears particularly at the inner boundary, and there frequently forms pure mangrove. The *Avicenniae* assume an intermediate position.

In view of the great extent of the Mangrove formation in British Honduras its study on ecological lines should prove interesting. It may be expected to exhibit the same general features as have been observed in Tabasco to the north, and Panama to the south.

*Coastal Savannahs*.—According to Dunlop, the coarse grasses which cover these savannahs have not been identified. Sabal palms (*Sabal excelsa*?) and Calabash trees (*Crescentia Cujete*) occur in places. Further information is desired as to the vegetation of the coastal savannahs, and as to whether they may not be of artificial origin. Morris mentions that “the pastures, commons, or fields, in the neighbourhood of settlements, are easily formed after the forest is cut down by the natural grasses of the country. Chief amongst these is *Paspalum distichum*, a wide-spreading broad-leaved grass, which forms a close turf much liked by cattle.” Morris also mentions that “often the belt of intermediate low growth between the coast and the virgin forests is termed broken-ridge; but in this case it is one that has been artificially formed by abandoned cultivated areas, and does not occur under the conditions which obtain in the natural state.”

*Cohune-ridge*.—“The term cohune-ridge (Spanish *corozal*) is applied to the low-lying lands generally bordering river valleys, or occupying extensive tracts or basins, as in the west and south, or at the heads of some of the river-systems. Geologically speaking a ‘cohune-ridge’ has been formed by a river-valley, or depression in the quartz ground-floor of the country, being, in process of time, filled up by large deposits of fine alluvium and vegetable débris brought down from the interior by means of rivers. Hence a cohune-ridge is deep, rich, and very abundantly supplied with nitrogenous compounds, affording splendid food for plants.”

“As its name indicates, a cohune-ridge has as its characteristic plant, the noble cohune-palm (*Attalea Cohune*), which in different stages of its growth, forms probably 20, and in some cases, 30 per cent. of the vegetation, the remainder being composed either of mahogany [*Swietenia macrophylla*], cedar [*Cedrela mexicana*], rosewood [*Dalbergia*], sapodilla [*Achras Sapota*], Santa Maria [*Calophyllum*], the smaller palms, or shade-loving trees . . . The ‘give-and-take’ (*Acanthothes*) is chiefly a cohune-ridge palm; it is so abundantly covered with long compound spines, about 3 to 4 inches long, that it is a very formidable object . . . The silver-thatch (*Thrinax argentea*), big-thatch (*Sabal mexicana*) and the monkey-tail (*Euterpe edulis*) grow in cool moist situations under the shade of tall timber-trees . . . Of the small palms belonging to the genera

*Chamaedorea* and *Geonoma* there are numerous species, forming a large percentage of the undergrowth. *Chamaedorea Ernesti-Augusti*, with its partially pinnate fronds and simple unbranched spadix, is often not more than 3 feet high when in fruit. Other species are *C. elegans*, *C. humilis*, *C. desmoncoides* and *C. graminifolia*."

Two species of *Castilloa* occur in British Honduras (*C. elastica* and *C. Tunu*). These are found in most of the cohune-ridges, but are daily becoming scarcer in the immediate neighbourhood of settlements.

The composition of the cohune-forest evidently varies. The forest between Seven Hills and the Toledo Settlement is "composed of valuable timber trees such as mahogany, axemaster, rosewood, augusta, salmwood, sapodilla, etc., with numerous palms. The cohune-palm forms about ten per cent. of the forest growth. The ground generally in the more open parts was carpeted with selaginellas, ferns, and shade-loving grasses. Under dense shade the undergrowth was very slight." Elsewhere aroids form part of the ground vegetation or, along with orchids, hang in festoons from the trees.

Among additional trees of this association mentioned by Hooper are Braziletto, Yemeri, Mylady, Palmaletto, Ziricote, Ironwood (*Laplacea*), Pigeonwood, Candlewood, Poisonwood, Bullhoof, Halfcrown, Billywebb, Dogwood (*Piscidia*), and Fiddlewood (*Citharexylon*); the undergrowth is extremely varied and includes *Melastomaceae*, *Piperaceae*, *Bromeliaceae*, *Zamia*, Bamboos, and several species of *Vanilla* and *Smilax*.

According to Dunlop, large areas of cohune-ridge have been exploited for the purposes of agriculture, and are now covered with secondary forest or bush, of which the Trumpet tree (*Cecropia*) is a common constituent.

*Broken-ridge*.—The broken-ridge is intermediate in character between the cohune-ridge and pine-ridge. The soil is more argillaceous than that of the cohune-ridge, and is often waterlogged. The trees are smaller, the undergrowth denser and more scrubby in character, and the vegetation as a whole is poorer and less luxuriant. It includes the gru-gru palm (*Acrocomia sclerocarpa*), Sabal palms, rosewood (*Dalbergia*), logwood, sapodilla, spiny shrubs of *Randia*, *Capparis*, cockspur (*Acacia spadicigera*) and several other *Leguminosae*. The more open spaces, clothed with rank grasses, coarse bromeliads and prickly creepers, form a transition to the pine-ridge country. Logwood and sapodilla are characteristic of the swamp country, which occurs more particularly on the north-east coast.

*Pine-ridge*.—"Where the original quartzzy rocks, in the form of a bold conglomerate, gravel or fine sand derived from the central zone, appear on the surface they give rise to extensive tracts of undulating or comparatively level country, known locally as 'pine-ridges,' so-called from the prevalence upon them of trees of the yellow pine [*Pinus caribaea*]."



"These tracts, as may be expected, possess a shallow poor soil, and they are covered only by hardy coarse grasses. The pines are dotted over the country in small clumps or singly, giving it an open park-like appearance. Associated with the clumps of pine-trees is a small slender fan-leaved palm known locally as pimento thatch." Other common pine-ridge plants in the south are the crabboe, a small shrubby tree yielding a kind of plum or cherry, and the haha, a wild fig, whose leaves are used as sandpaper. Amongst the hard coarse grass of the pine-ridge small low-spreading shrubs are found, such as *Pithecolobium ligustrinum* and *Cassia diphylla*; a few ground orchids (*Habenaria* and *Stenorrhynchus*) and small yellow-flowered hypoxids. According to Dunlop, the carpet of grasses on the Great Southern pine-ridge is largely composed of *Leptocoryphium lanatum* and *Axonopus laxiflorus*.

To the west the ordinary pine-ridge plants give place to groves of oak (*Quercus virens*). Hooper states that this oak, which is associated with the pine-trees in the interior hills at high elevation, monopolises the ground in the depressions of the ridges, which are everywhere undulating. Besides the oak there is an occasional undergrowth of straggling Acacias, Cocoplum, groups of Palmetto (*Chamaerops tomentosa*), *Thrinax*, Sabal, and *Acrocomia*, while in the creeks dividing the ridges occur *Podocarpus*, *Selaginella arborea*, *Pitcairnia* and *Clusia*.

According to Hooper, in some localities *Pinus caribaea* forms a pure association. On the Great Southern pine-ridge he counted 101 trees to the acre, and at All Pines 245 trees.

#### BOTANICAL EXPLORATION.

The flora is perhaps less known than that of any other British Colony. Prior to 1883 there were probably not more than twenty dried plants from British Honduras in the Kew Herbarium. About fifty or sixty more were received from Mr. [now Sir] D. Morris and Mr. E. D. M. Hooper during the period 1883-1886. Sir A. Moloney sent 65 specimens to Kew in 1894, and about 200 were received in small instalments from Mr. E. J. F. Campbell, Curator of the Botanic Gardens, Belize, during 1898-1911. About 50 herbarium specimens principally of trees were received during 1920-1921 from Mr. C. Hummel, Conservator of Forests, British Honduras: some of these proved to be new, e.g., *Vochysia hondurensis*, *Rinorea Hummelii* and *Belotia Campbellii*.

Professor Morton E. Peck visited British Honduras during 1905-07 and formed a collection of about 1,000 numbers of dried plants, the first set of which appears to be at the Gray Herbarium. No complete enumeration of the collection has been published, but an account of the *Gramineae* was given by F. T. Hubbard in the Proceedings of the American Academy, xlix. 493-502 (1913), and numerous new Dicotyledons have been described by S. F. Blake in Contributions from the Gray Herbarium, n.s. lii. 59-106 (1917). One of the later sets was acquired for the Kew

Herbarium; the specimens are numbered, but are without collector's labels, so that localities cannot be given except in the case of those species mentioned by Hubbard and Blake.

A set of 194 dried plants from the Colony collected by the Rev. J. Robertson in 1889-90 was purchased by the British Museum (Natural History) in 1890; as far as possible these have been included in the present enumeration.

The total number of Phanerogams in British Honduras may be estimated at not less than 4,000 species. There are about 2,800 in Jamaica, which has an area of 4,200 square miles. British Honduras on account of its continental position and much larger area may be expected to contain half as many again. Our enumeration which is based on the material in the Kew Herbarium and the British Museum, and on records from all sources, will probably not include more than 800 species. As pointed out in *Kew Bulletin* 1905, p. 43, the Colony still remains botanically a *terra incognita*. Before a comprehensive flora can be prepared organised exploration by experienced systematic botanists is necessary.

#### SELECT LIST OF WORKS RELATING TO BRITISH HONDURAS.

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Dunlop, W. R. Report on the economic and natural features of British Honduras (London, Crown Agents for the Colonies, 1921).

[In order to economise space the following abbreviations have been adopted: BW., Bristowe and Wright, Handbook of British Honduras for 1889-90; CNH., Contributions from the United States National Herbarium; H., Hooper, Report upon the forests of Honduras; M., Morris, The Colony of British Honduras; PAA., Proceedings of the American Academy.]

#### RANUNCULACEAE.

**Clematis dioica** L.; CNH. xxiii. 267.

Peck 736.

Differs from typical *C. dioica* from the West Indies in the coarsely serrate leaflets.

#### DILLENIACEAE.

**Davilla Kunthii** A. St.-Hil.; Triana et Planch. Prodr. 18.

Peck 322.

**Curatella americana** L.

All Pines, fl. April, *Robertson* 193; *Campbell* 30; *Peck* 689.

Leaf used as a substitute for sand-paper by the natives of the interior (*Campbell*).

**Doliciocarpus pubens** Mart.; Triana et Planch. Prodr. 17.

Peck 270.

#### ANONACEAE.

**Guatteria diospyroides** Baill. in *Adansonia*, viii. 269 (1868).

Peck 583.

Petioles shorter and leaves relatively broader than the single authenticated specimen in the Kew Herbarium.

**Cymbopetalum penduliflorum** (Dunal) Baill. in *Adansonia*, viii. 268 (1868); CNH. xxiii. 279.—*Unona penduliflora* Dunal, *Monogr. Anon.* 100, t. 28 (1817).

Peck 891.

**Anona glabra** L.; CNH. xviii. 14.—*A. palustris* L.; M. 86; *Fawcett and Rendle*, *Fl. Jam.* iii. 197.

Vernacular names "Corkwood", "Alligator-apple".

The wood is used for lining boxes, stopping bottles, etc. The fruit is narcotic and probably poisonous (*Morris*).

- A. involucrata** *Baill.* in *Adansonia*, viii. 265 (1868); CNH. xviii. 32.—*A. Prestoei* *Hemsl.* in *Hook. Ic. Pl.* tt. 2519, 2520 (1897).  
 Cayo village, *Campbell* 113.  
 Vernacular name "Tooky".  
 The fruits are eaten.

- Xylopia frutescens** *Aubl.* *Hist.* i. 602, t. 242 (1775): *Triana et Planch. Prodr.* 39.  
*Campbell* 6.  
 Vernacular name "Pole wood".

## MENISPERMACEAE.

- Cissampelos Pareira** *L.*; *Diels* in *Engl. Pflanzenr. Menisperm.* 286.  
 Stann Creek, fl. April, *Robertson* 175; *Peck* 274.  
**C. tropaeolifolia** *DC.*; *Diels*, l.c. 299.  
*Peck* 602.

## NYMPHAEACEAE.

- Nymphaea ampla** (*Salisb.*) *DC.*; *Conard*, *Waterlilies*, 134 (1905).  
 —*Castalia ampla* *Salisb.*  
*Peck* 469.

- N. ampla** var. **pulchella** (*DC.*) *Casp.*; *Conard*, l.c. 136.  
 Belize, in mangrove swamps, *Robertson* 20.  
*Robertson's* specimen was named var. *pulchella* by *Conard* (*Mus. Brit.*) but was cited by him under typical *N. ampla* (l.c. 135).

## CAPPARIDACEAE.

- Cleome spinosa** *Jacq.*; *Fawcett and Rendle*, *Fl. Jam.* iii. 225.  
 Belize, in house gardens, *Robertson* 4.  
**Capparis** sp.; *M.* 64.  
 A small-leaved spiny shrub growing on broken-ridge (*Morris*).  
 Herbarium specimens are desired in order to identify the species.

## CISTACEAE.

- Lechea tripetala** (*Moc. et Sessé*) *Britton* in *Bull. Torr. Bot. Cl.* 1894, xxi. 252; *Engl. Pflanzenr. Cistac.* 139.—*L. Skinneri* *Benth.* (1844). *Helianthemum tripetalum* *Moc. et Sessé ex Dunal* (1824); *Ic. Ined.* t. 47.  
*Peck* 143.

## VIOLACEAE.

- Rinorea Hummelii** *Sprague* in *Kew. Bull.* 1921, 307.  
 Salt Creek, *Hummel* 11; *Hillbank*, *Hummel*; *Hooper*.

## SAUVAGESIACEAE.

- Sauvagesia erecta** *L.*  
 Stann Creek, fl. March, *Robertson* 141; *Peck* 55.



## BIXACEAE.

**Cochlospermum vitifolium** Willd.—*C. hibiscoides* Benth. *Maximiliana vitifolia* Krug et Urb.; Blake in Journ. Wash. Acad. Sc. xi. 128 (1921).

Stann Creek, fl. March, *Robertson* 122; *Campbell*; *Peck* 686.

**Bixa Orellana** L.; M. 85.

Vernacular name "Anatto".

## POLYGALACEAE.

**Polygala adenophora** DC.; Chodat, Monogr. ii. 178, t. xxi. fig. 33–34.

*Peck* 133.

**P. asperuloides** H.B.K.; Blake in Contr. Gray Herb. n.s. xlvii. 84.

Wet pine-ridge near Manatee Lagoon, *Peck* 234.

**P. hygrophila** H.B.K.; Chodat, l.c. 161, t. xxi. fig. 11–12; Blake l.c. 89.

*Peck* 908.

**P. longicaulis** H.B.K.; Chodat, l.c. 182, t. xxii. fig. 1–3; Blake l.c. 93.

Low pine-ridge near Manatee Lagoon, *Peck* 132.

**P. paniculata** L.; Chodat, l.c. 229, t. xxiv. fig. 10–11; Blake l.c. 99.

Open ground near Manatee Lagoon, *Peck* 242; *Campbell* 32.

**P. variabilis** H.B.K.; Chodat, l.c. 180, t. xxi. fig. 35–36; Blake l.c. 95.

Open ground near Manatee Lagoon, *Peck* 147; Stann Creek, *Robertson* 194.

**Bredemeyera lucida** (Benth.) A. W. Benn. in Mart. Fl. Bras. xiii. pars 3, 51 (1874).—*Catocoma lucida* Benth. in Hook. Journ. Bot. 1842, iv. 101; Griseb. Fl. B.W.I. 29.

*Peck* 336.

Better material is desired in order to confirm the identification. The species was previously known from British Guiana and Trinidad, and, according to Bennett, from Brazil.

**Securidaca erecta** Jacq.; Fawcett and Rendle, Fl. Jam. iv. 246. *Campbell* 17.

## VOCHYSIACEAE.

**Vochysia hondurensis** Sprague in Kew Bull. 1922, 183.

*Campbell* 19; Punta Gorda, *Hummel* 6; *Peck* 912.

Vernacular names "Yemeri", "Red Yemeri".

A large tree yielding a good wood for boards, and used extensively for making small boats.

## CARYOPHYLLACEAE.

**Drymaria cordata** Willd.; Fawcett and Rendle, Fl. Jam. iii. 175, fig. 67.

Belize town, fl. Dec., *Robertson* 26; *Peck* 519.

## PORTULACACEAE.

**Portulaca oleracea** L.

Melinda, a weed, *Robertson* 215.

**P. pilosa** L.

Stann Creek, a common annual in gardens, fr. April, *Robertson* 209; *Peck* 475.

## HYPERICACEAE.

**Hypericum terrae-firmae** *Sprague et Riley*, sp. nov.: affine *H. styphelioidi* A. Rich., a quo foliis longioribus pro rata angustioribus subtus haud punctatis, sepalis lanceolatis distinguitur.

*Caules* pluries furcati, 3 mm. diametro 3.5 dm. infra apices ramulorum, parte foliata 6-7 cm. longa, cicatrices foliorum circumscriptione sursum late rotundatae, medio leviter emarginatae, deorsum bisinuatae, id est. medio convexae et utrinque concavae, lateribus deorsum cuspidatae. *Folia* sessilia, oblongo-lanceolata, 1.5-2.5 cm. longa, 3.5-4.5 mm. lata, apice acuta, in basin latam a medio angustata, supra leviter concava marginibus cartilagineis, basi quinquinervia superne trinervia, glandulis elevato-punctatis, subtus pruïnosa costa prominente nervis quam supra minus obviis, glandulis haud elevatis itaque inconspicuis. *Flores* in apicibus ramulorum solitarii. sessiles, foliis circumdati. *Sepala* lanceolata, sensim in apicem angustata, 1.1 cm. longa, 3 mm. lata, circiter 10-nervia nervis instar striarum, coriacea, glabra, eglandulosa. *Petala* circiter 2.3 cm. longa, 6 mm. lata, multinervia. *Stamina* numerosissima, circiter 1 cm. longa. *Ovarium* ellipsoideum, 3 mm. longum, 2.5 mm. diametro, glabrum, uniloculare, multiovulatum. *Styli* 5.5 mm. longi, basi in tubum 0.5 mm. longum coaliti; stigmata capitata. *Capsula* 5 mm. longa, 4 mm. diametro, sepalis petalisque persistentibus tecta. *Semina* cylindrica, leviter curvata, 1 mm. longa, vix ultra 0.25 mm. diametro, punctato-striata.

British Honduras, *Peck* 321 (type in Herb. Kew); *Hooper*.

The representative on the mainland of the Cuban *H. styphelioides*. In *H. terrae-firmae* and *H. styphelioides* the leaves disarticulate at the base, whereas in *H. caracasenum*, *H. pineleoides* and *H. Mutisianum* they break off above the basal portion, which remains attached to the stem. Keller appears to have overlooked the existence of *H. pineleoides*, and to have re-described it as a new variety, *H. caracasenum* var. *ocanense* (Bull. Herb. Boiss. sér. 2, viii. 183; 1908).



**Vismia Camparaguey** *Sprague et Riley*, sp. nov.; cum *V. ferruginea* H.B.K. olim confusum, foliis longioribus lanceolatis basi nunquam acutis sed contra aliquando subcordatis, sepalis post anthesin haud reflexis diversa.

*Caules* compressi, sulcati, 3 mm. lati 3 dm. infra apicem, ferrugineo-tomentosi, internodiis 5-5.7 cm. longis. *Folia* lanceolata, acuminata, basi rotundata vel subcordata, 11-18 cm. longa, 5.8-6.5 cm. lata, coriacea, utrinsecus 15-16-nervia, supra glabra, subtus laxe ferrugineo-tomentella; petioli 1-1.7 cm. longi. *Thyrsi* terminales, circiter 8.5 cm. longi, 6-6.5 cm. lati, multiflori; bracteae 1 mm. longae; pedicelli sulcati, 5-8 mm. longi. *Sepala* aestivatione quincuncialia, ovato-lanceolata, obtusa, 6.5 mm. longa, 2-3.5 mm. lata, crassa, extus ferrugineo-tomentosa, intus glabra, basi 1 mm. connata; interiora marginibus membranaceis 0.5 mm. latis. *Petala* oblanceolata, apice obtusa, in basin sensim angustata, 7 mm. longa, 3 mm. lata, multinervia, extus glabra, intus villosa. *Squamae* 1 mm. longae, 0.75 mm. latae, villosae. *Staminum phalanges* polyandreae, 5.5-6 mm. longae, villosae, versus basin glabrescentes. *Ovarium* ovoideum, 2.5 mm. longum, 2 mm. diametro, glabrum, loculis multiovulatis. *Styli* 5, 3 mm. longi, glabri; stigmata peltata. *Bacca* ovoidea, 1.1 cm. longa, 9 mm. diametro, glabra, stylis coronata, inferne sepalis persistentibus tecta.—*V. ferruginea* Donnell Smith Enum. Pl. Guat. vi. 3 (1903), non H.B.K.

Central America: Guatemala; Alta Verapaz, Cubilquitz, 350 m., *Tuerckheim in Donnell Smith* 7825 (type in Herb. Kew). British Honduras, *Peck* 878.

Vernacular name "Camparaguey".

**V. macrophylla** H.B.K. Nov. Gen. v. 184 (1822); Triana et Planch. Prodr. 304.

*Peck* 941.

*V. macrophylla* was discovered by Humboldt and Bonpland by the river Cassiquiare in Venezuela. According to the original description the young branchlets are glabrous, and the leaves are 6 in. long and 3 in. broad. Triana and Planchon (l.c.) identified *V. macrophylla* with a Colombian and Central American species which has tomentose branchlets, and leaves about three times as long as their breadth. They stated that the type specimen in Bonpland's herbarium was so imperfect as to render comparison difficult. Although there is some doubt as to the correctness of their identification, it seems desirable to accept it until better material has been obtained from the original locality.

#### GUTTIFERAE.

**Clusia** sp.; H. 6.

In the creeks dividing the pine-ridges (Hooper).

Herbarium specimens are desired in order to determine the species.

**Symphonia globulifera** *L. f.*; M. 85.

Near Regalia Estate, *Morris*; Manatee, *Hummel* 19.

**Rheedia** sp.

Macaroni Hill, *Campbell* 94.

A tree, fruit eaten as "Waika plum" (Campbell). The herbarium specimens consist of branchlets bearing leaves and numerous axillary fascicles of male flowers. These have two sepals, four petals in two whorls, and about 11-17 stamens surrounding a rugose rudiment of an ovary. Specimens bearing female flowers and fruits are desired, as the species appears to be hitherto undescribed.

**Calophyllum Calaba** *Jacq.*; M. 62; BW. 199; H. 32.

Vernacular name "Santa Maria".

Used for various purposes including Mahogany trucks.

**Calophyllum** sp.

Mullins River, *F. Arnold*.

Vernacular name "Santa Maria".

Probably an undescribed species. Specimens bearing flowers and fruits are desired.

**Mammea americana** *L.*; H. 32.

"A tall tree 80 ft. high, 30 inches diameter, giving a handsome wood" (Hooper).

Vernacular name "Mammee Apple".

## MARCGRAVIACEAE.

**Marcgravia nepenthoides** *Seem.* in Journ. Bot. 1870, 245; Hemsl. Biol. Centr.-Amer., Bot. i. 90, t. 6.

*Peck* 822.

Previously known from Nicaragua only.

## THEACEAE.

**Ternstroemia** sp.

*Peck* 470.

Material insufficient to determine the species with certainty.

**Laplacea haematoxylon** (*Swartz*) *Camb.*; M. 62; BW. 201.—*Gordonia haematoxylon* *Swartz*.

Vernacular name "Ironwood".

The record requires confirmation. *L. haematoxylon* is a native of Jamaica. Possibly some other theaceous tree may have been mistaken for it in British Honduras.

## MALVACEAE.

**Sida acuta** *Burm.*; E. G. Baker in Journ. Bot. 1892, 238.

Mullins River, *Robertson* 38; *Peck* 155.



**S. althaeifolia** Swartz—*S. cordifolia* E. G. Baker, l.c. 291, partim, non L.

Stann Creek, fl. Jan., *Robertson* 43.

**S. ciliaris** L.; E. G. Baker, l.c. 141.

*Peck* 175, 452.

**S. dumosa** Swartz; E. G. Baker, l.c. 296.

*Hooper*.

**S. linifolia** Juss.; E. G. Baker, l.c. 140.

*Peck* 243.

**S. paniculata** L.; E. G. Baker, l.c. 294.

*Peck* 618.

**Wissadula excelsior** Presl; R. E. Fries in Svensk. Vet.-Akad. Handl. n.s. xliii. no. 4, 44 (1908).

Stann Creek, fr. March, *Robertson* 130; *Peck* 266.

**Malachra alceifolia** Jacq.; Gürke in Engl. Jahrb. xvi. 350 (1892).

Stann Creek, fl. Jan., *Robertson* 69; Punta Gorda, fl. April, *Robertson* 237; *Peck* 606.

**M. fasciata** Jacq.; Gürke, l.c. 353.

*Peck* 630.

**Pavonia rosea** Schlecht.

*Peck* 173.

**P. spicata** Cav.; Urb. Symb. Antill. iv. 397.—*P. racemosa* Swartz.

Mullins River, common, fr. March, *Robertson* 183.

**Malvaviscus brevibracteatus** E. G. Baker in Journ. Bot. 1899, 347.

Belize, in mangrove swamps, fl. and fr. Dec., *Robertson* 34, 35.

**M. sp.**

*Peck* 199.

**Hibiscus Abelmoschus** L.

*Moloney* 31 (fide R. A. Rolfe in Kew MS. Plant Lists, xxxii. 91).

**H. costatus** A. Rich.; Hochr. in Ann. Conserv. et Jard. Bot. Genève, iv. 106 (1900).—*H. australis* Rose ex Donn. Smith, Enum.

Pl. Guat. vi. 4 (1903), nomen.

*Campbell* 17; *Peck* 213.

**H. Sabdariffa** L.

Stann Creek, planted, fl. Jan., *Robertson* 50.

Vernacular name "Sorrel".

Used in cooking.

**Paritium elatum** (Swartz) G. Don; M. 62.—*Hibiscus elatus* Swartz; BW. 199.

"Yields a darkish-green wood of great value; as also the celebrated Cuba bast, an article of commerce prepared from the inner layers of the bark" (Morris).

Vernacular name "Mahoe".

Herbarium specimens are desired in order to confirm the record, which may possibly relate to *P. tiliaceum*. Some authors have regarded these two species as synonymous.

**P. tiliaceum** (L.) A. Juss.—*Hibiscus tiliaceus* L.; Kew Bull. Add. Ser. ix. 75.

Mullins River, in a marsh close to the sea, *Robertson* 57; *Peck* 105.

Vernacular name "Mahoe".

A small tree, with straw-coloured flowers (*Robertson*).

**Thespesia populnea** Cav.

Belize, fl. March, *Robertson* 179.

Vernacular name "Cork tree".

**Gossypium** sp.

Stann Creek, *Robertson* 164.

Material insufficient to determine the species.

#### BOMBACACEAE.

**Pachira macrocarpa** Walp.—*P. aquatica* M. 85; BW. 201: H. 32; non Aubl.

*Barlee*. Common along river banks and in moist places.

Vernacular name "Provision tree".

The seeds are sometimes used for food by the natives during times of scarcity (*Morris*). The timber is used for fencing-posts (*Hooper*).

**Ochroma bicolor** Rowlee in Journ. Wash. Acad. Sc. 1919, ix. 165.

Hillbank and Stann Creek, *Hummel*; *Peck* 784.

Vernacular name "Polak".

Flowering material is desired in order to confirm the identification.

**O. concolor** Rowlee, l.c. 161.

Guatemala: Livingston, *Hummel*.

Vernacular name "Polak".

"It has not been reported from outside of Guatemala, but undoubtedly grows in adjacent Honduras and British Honduras, and in all probability in southern Yucatan" (*Rowlee*).

**O. velutina** Rowlee, l.c. 164.

By the Rio Grande, at Colombia, *Hummel*.

Vernacular name "Polak".

The material consists of two detached leaves, which have a less dense indumentum on the lower surface than authenticated specimens in the Kew Herbarium. Good flowering specimens are desired in order to confirm the identification.

**Ceiba** sp.; M. 44.

Along the banks of the Old River (*Morris*).

Vernacular name "Silk-Cotton tree".



A good series of herbarium specimens including young leafy branches still bearing *stipules* (which are caducous), mature leaves, flowering shoots and fruits, are desired. The Silk-Cotton trees of America and the Old World are still very imperfectly known, and several distinct species appear to have been confused under the name *Ceiba pentandra* Gaertn. (*Eriodendron anfractuosum* DC.).

**Ceiba** sp.

Mullins River, *Hummel*.

Vernacular name "Cotton Wood".

The specimen consists of a single shoot bearing five leaves with 7-9 leaflets each. Flowering shoots and fruits are desired in order to determine the species, which may possibly be identical with the preceding.

The genus *Bombax* doubtless occurs in British Honduras.

STERCULIACEAE.

**Helicteres retinophylla** R. E. Fries in Svensk. Vet.-Akad. Handl. n.s. xlii. no. 12, 23 (1908).

*Hooper*; *Peck* 96.

According to R. A. Rolfe in Kew MS. Plant Lists, xxxii. 91, verso, *Moloney* 47 (which was treated as a duplicate) was identified as *H. guazumifolia* H.B.K. Until recently several species have been included under *H. guazumifolia*, and it is possible that *Moloney* 47 may have been *H. retinophylla*, which was then undescribed. Hooper's specimen was originally identified as *H. guazumifolia*.

**Pentapetes phoenicea** L.

*Campbell* 26.

A native of Eastern and Southern Asia. It appears to have become naturalized in British Honduras.

**Melochia hirsuta** Cav.; K. Schum. in Mart. Fl. Bras. xii. pars 3, 45.

*Peck* 297.

**Waltheria americana** L.; K. Schum. l.c. 63.

*Peck* 5, 169.

**Theobroma angustifolium** DC. Prodr. i. 184 (1824); Bernoulli, Uebersicht Theobroma, 12, t. 6; Mociño et Sessé, Ic. Ined., ed. A. DC., t. 112 (1874); M. 72?

Morris considered that some of the wild cacao trees seen by him in British Honduras approached *T. angustifolium* in their characters.

**T. Cacao** L.; Bernoulli, Uebersicht Theobroma, 5, tt. 1, 2 fig. 1; M. 72.

*Peck* 516, 876.

"In the forests along the banks of the Rio Grande and in the neighbourhood of the Toledo Settlement, and again in the forests of the western frontier, near the upper portions of the Belize

River, cacao-trees are found wild in the woods, with their stems covered with flowers, and often loaded with fruit. The trees which came under my notice in the south were probably forms of the same species (*Theobroma Cacao*) which yields the best kinds of Trinidad cacao" (Morris).

Among other species of *Theobroma* which should be looked for in British Honduras are *T. leiocarpa* Bernoulli, *T. pentagona* Bernoulli, and *T. bicolor* H.B.K.

**Guazuma tomentosa H.B.K.?**

The identification is uncertain, being based on a single leafy shoot, without flowers or fruit, gathered at Hillbank by Mr. Hummel, to whom the specimen has been returned.

Vernacular name "Bay Cedar".

Good flowering specimens, and others with fruit attached, are desired in order to determine the species with certainty.

**Buettneria carthaginensis Jacq.**

Peck 260.

**B. catalpifolia Jacq.:** K. Schum. in Mart. Fl. Bras. xii. pars 3, 92, t. 20.

Peck 827.

There appear to be two species referred to *B. catalpifolia* which differ in the fruit. Both range from Brazil to Central America. One has long slender spines, whereas the other has shorter, stouter spines, and somewhat larger fruit. Peck's plant is the latter, and agrees with Schumann's description and figure cited above. The fruit was unfortunately not known to Jacquin, so that it will be difficult to determine with which species he was dealing.

**TILIACEAE.**

**Belotia Campbellii Sprague** in Kew Bull. 1921, 277.

British Honduras: Seven Hills Estate, *Campbell* 75; Sibun River, *Campbell* 81; Stann Creek, about 12 miles from Stann Creek town, *Hummel*; Manatee, *Hummel* 20; *Peck* 340. Guatemala: Puerto Barrios, *Deam* 146.

**Triumfetta Lappula L.**

Stann Creek, fl. March, *Robertson* 126, 130.

**T. sp.**

*Peck* 240.

Specimens bearing mature fruits are required to determine the species.

**Corchorus olitorius L.**

Raised from seed from Belize, British Honduras, *C. F. Baker* 31. An important minor vegetable of tropical gardens. In Nicaragua the natives commonly use the younger leaves in soups (*C. F. Baker*).

**C. siliquosus L.**

*Peck* 310.



**Luhea platypetala** A. Rich.

Peck 126.

**L. Seemannii** Triana et Planch.

Seven Hills Estate, Campbell 74, 105; Peck 644.

The genus *Muntingia*, which was included by Bentham and Hooker (Gen. Pl. i. 236) in *Tiliaceae* tribe *Tilieae*, was transferred by K. Schumann (Mart. Fl. Bras. xii. pars 3, 166) to the tribe *Prockieae*. Schumann afterwards treated the *Prockieae* as belonging to the *Elaeocarpaceae* (Engl. et Prantl, Nat. Pflanzenf. Nachtr. i. 230). but they are now more generally included in the *Samydaceae* (*Flacourtiaceae*).

## ELAEOCARPACEAE.

**Sloanea eriostemon** Sprague et Riley, sp. nov.: affinis *S. usurpatrici* Sprague et Riley, a qua ramulis crassioribus rugosis diu velutinis, foliis discoloribus subtus opacis minute setulosis, petioliis velutinis, filamentis dense pilosis, antheris patule pilosis recedit.

*Ramuli* lignosi, rugosi, crassi, 7 mm. diametro 1 dm. infra apicem, cicatricosi, plus minusve ferrugineo-velutini. *Folia* elliptico-obovata, ambitu generali superne obtusissima vel minute cuspidata. basi rotundata. 15.5–23 cm. longa 11.2–13.5 cm. lata, inferne primo visu integra, revera subtilissima repando-dentata, versus apicem magis conspicue dentata, utrinsecus 12–14-nervia, supra glabra costa nervisque exceptis, subtus valde reticulata, costa nervisque lateralibus valde prominentibus substriatis breviter ferrugineo-pilosis. tertiariis et venulis etiam ultimis minute setulosis; petioli 3–5 cm. longi. medio 2.5–3 mm. diametro, apice basique incrassati, ferrugineo-velutini; stipulae caducae, triangulari-acuminatae. 7.5 mm. longae e basi fere 2 mm. latae. *Inflorescentiae* subsessiles, axillares, compositae, solitariae sed primo visu ter geminive fasciculatae ob ramulos infimos e basi rhacheos primariae orientes, laxe decussato-racemosae, apice subcorymbosae, 3.5–6 cm. longae, internodiis 1–2.5 cm. longis, omnino dense et crispule pilosae; bractae inferiores ovato-acuminatae, 2 mm. longae, circiter 1 mm. latae, superiores subulatae, circiter 5 mm. longae; pedicelli 0.9–1.5 cm. longae. *Calyx* 4 mm. longus, 5–6-lobus. lobis lanceolato-ovatis acutis 2.75 mm. longis 2 mm. latis. *Petala* nulla. *Stamina* circiter 70, 4.5 mm. longa; filamenta 3 mm. longa, dense pilosa; antherae 1.5 mm. longae, brevissime et obtuse apiculatae, patule pilosae. *Ovarium* elliptico-ovoideum. 1.5 mm. longum, 1.25 mm. diametro, pilis ascendentibus dense obtectum, 4-loculare, loculis 7–8-ovulatis. *Stylus* eccentricus, quadrangulatus, valde sulcatus, apice breviter quadrifidus, 3.25–3.5 mm. longus, inferne appresse pilosus. *Fructus* immaturus ellipsoideus, circiter 1 cm. longus, setis patentibus 1.5–2.3 cm. longis setulas minutas rigidas acutas ascendentes gerentibus satis obtectus, calyce persistente patente.

British Honduras. Peck 400 (type in Herb. Kew).

A description of a closely allied species from British Guiana hitherto confused with *S. sinemariensis* Aubl. is appended.

**Sloanea usurpatrix** *Sprague et Riley*, sp. nov.: diu cum *S. sinemariensis* Aubl. confusa, attamen foliis elliptico-oblongis breviter cuspidatis nec suborbicularibus emarginatis, racemis compositis, floribus numerosioribus, calycis indumento facillime distinguenda.

*Ramuli* juniores valde sulcati, breviter fulvo-pilosi; vetustiores obscure striati, brunneo-nigrescentes, glabriusculi, 5 mm. diametro 1.5 dm. infra apicem. *Folia* elliptico-oblonga, ambitu generali superne rotundata vel obtusissima, breviter acute cuspidata, basi rotundata vel subcordata, 12-24 cm. longa, 7.5-14 cm. lata, obscure et late undulato-crenulata crenulis superne conspicuioribus, coriacea, utrinsecus 9-13-nervia, supra glabra costa nervisque lateralibus sparsissime pilosis exceptis, subtus nitidula, reticulata, nervo medio striato ut nervis lateralibus et tertiariis ferrugineo-piloso, ceterum glabra; petioli 2.5-5.5 cm. longi, medio 2 mm. diametro, apice basique incrassati, striati, sparse pilosi; stipulae caducae, lanceolato-acuminatae, 1 cm. longae c. basi 2 mm. lata, molliter fulvo-pilosae. *Inflorescentiae* axillares, solitariae, subsessiles, compositae, laxe decussato-racemosae, 3-4 cm. longae, internodiis 0.5-1 cm. longis, rhachi et ejus ramulis setulis parvis ascendentibus obtectis; bractae lanceolatae vel subulatae, 3-5 mm. longae; pedicelli 0.5-1.5 cm. longi. *Calyx* 3.5 mm. longus, irregulariter 6-7-lobus, lobis lanceolatis vel lanceolato-ovatis 1.5-2.75 mm. longis 0.75-2 mm. latis acute acuminatis. *Petala* nulla. *Stamina* 70-80, fere 5 mm. longa; filamenta 3.5 mm. longa, sparse et minute patenter pilosa; antherae 1-1.5 mm. longae, sparse et minute appresse pilosae. *Ovarium* globosum, 1.5 mm. diametro, pilis sursum appressis dense obtectum, 4-loculare, loculis 9-10-ovulatis. *Stylus* quadrangulatus, valde sulcatus, apice quadrifidus, 4.5 mm. longus, fere ad medium appresse pilosus, in ovarium gradatim dilatatus. *Fructus* non visus.—*S. sinemariensis* Benth. in Journ. Linn. Soc. v. suppl. ii. 68 (1861) partim, non Aubl.

British Guiana: *Rob. Schomburgk* 1021 partim (type in Herb. Kew); *Rob. Schomburgk* 1044.

## II.—HUMBOLDT AND BONPLAND'S MEXICAN ITINERARY.

T. A. SPRAGUE.

The travels of Humboldt and Bonpland laid the foundations of our knowledge of the flora of Mexico. Their Mexican botanical collections comprised about 972 species, most of which were described as new. A knowledge of the localities where these were collected is of great importance to students of the Mexican flora, as it facilitates the task of identification. But



many of the place-names cited in the *Nova Genera et Species* are not to be found in any modern atlas or gazetteer. Some of these localities, but not all, are marked in the various maps included in Humboldt's *Atlas Géographique et Physique*, but the discovery of a single place-name may require a prolonged search. Hence it has seemed desirable to publish an index of the Mexican localities visited by Humboldt and Bonpland. For convenience of reference these localities have been numbered in a single series based on the list given in the *Nova Genera*, vii. 433-435, with additional place-names mentioned in the enumeration of Mexican species (i.e. 436-468). Names which may be found in a good atlas are printed in black type. The altitudes are those given by Humboldt: in a few cases more recent estimates have been added in brackets.

A few examples may be given to explain how the Index of localities should be used. The name Ocotlan is followed by the number 148 in the Index: reference to this number in the Itinerary shows that Ocotlan is situated between Mexico and Puebla, and that its altitude according to Humboldt is 7206 ft. Chapoltepec is followed by two numbers, 111 and 136. The Itinerary shows that no. 111 lies between Morelia and Patzenaro, both well-known places, and that its altitude is 6432 ft. Chapoltepec, No. 136, on the other hand, is situated in the valley of Mexico, at 7150 ft. The only Mazatlan to be found in any ordinary atlas or gazetteer is the important seaport of that name in Sinaloa. Reference to the Index and Itinerary, however, shows that Humboldt's Mazatlan is a small place in Guerrero, between Acapulco and Chilpancingo. Those who desire to fix the position of any locality more exactly may refer to the maps and works cited at the head of each division of the Itinerary. Mazatlan, for example, is marked as a village on map 5 (Mexican section) of Humboldt's Atlas, and is stated, in the Admiralty Handbook of Mexico, p. 354, to be 99 miles distant by road from Acapulco, and 10 miles from Chilpancingo.

#### ITINERARY.

##### Acapulco to Mexico city. April 1803.

(See H.B.K. Nov. Gen. vii. 433; Humb. et Bonpl., Voyage, Atlas Géogr., Mex. tt. 5, 13; Admiralty Intell. Div. 1205, Handbook of Mexico, 353; Gadow, Through Southern Mexico, chapters xvi-xix., xxii.)

1 **Acapulco**; 2 Cojuca (Coyuca), Playas de; 3 Cuesta del Limon; 4 Venta del Exido (Egido, Ejido), 1278 ft.; 5 Tambo del Exido; 6 Alto del Camaron, 1230 ft.; 7 Alto de los Pozuelos, 1380 ft.; 8 Valle del Peregrino, 492 ft.; 9 Alto del Peregrino, 1074 ft.; 10 Valle del **Papagayo** (**Papagallo**), 582 ft.; 11 Venta de Tierra Colorada, 1224 ft.; 12 Venta de la Moxonera, 2280 ft.; 13 Quaxini-quilapa; 14 Alto de los Caxones, 3510 ft.; 15 Acaguisotla, 3024 ft.; 16 Masatlan (Mazatlan), 3906 ft.; 17 Chilpanzingo (Chilpancingo),

**Chilpancingo**), 4248 [4527] ft.; 18 **Sumpango (Zumpango)** 3360 ft.; 19 Sochipala; 20 Cañada de Sopilote (**Zopilote**); 21 Valle de Sopilote (**Zopilote**), 3102 ft.; 22 Mescala (**Mexcala**), 1590 ft.; 23 Rio de Mescala (**Mexcala**); 24 Estola, Venta de, 2532 ft.; 25 **Tepecuacuilco**, 3108 ft.; 26 Tehuiloteppec, 5514 ft.; 27 **Tasco** (Taxco), 5508 [5500] ft.; 28 Guasintlan, 3228 ft.; 29 **Puente de Ixtla** (Istla), 3024 ft.; 30 Acamistla; 31 **Cuernavaca**, 5094 [4500] ft.; 32 Guchilaque, 7518 ft.; 33 La Cruz del Marqués, 9222 ft.; 34 El Guarda; 35 San Agustín de las Cuevas, 7146 ft.; 36 **Tezcuco**, Laguna de, 6996 ft.; 37 **Mexico city** (Tenochtitlan), 7008 [7466] ft.

Between Mexico city and Actopan (State of Hidalgo),  
May-June 1803.

(See H.B.K. Nov. Gen. vii. 434; Humb. et Bonpl. Voyage, Atlas Géogr. t. 7, Mex. t. 1, S. half; Admiralty Intell. Div. 1205, Handbook of Mexico, 390.)

38 Carpio, 7080 ft.; 39 Gasave, 7392 ft.; 40 **Pachuca**, 7638 [8024] ft.; 41 La Cruz del Cerro Ventoso, 8544 ft.; 42 San Pedro, Mina de; 43 **Real del Monte**, 8556 ft.; 44 Biscaina, Mina de la; 45 Moran (Real de Moran), 7986 ft.; 46 Cabrera; 47 Omitlan, 7578 ft.; 48 Llano de las Tinajas (Tinaxas), 8364 ft.; 49 El Oyamel, 9468 ft.; 50 Cerro de las Nabajas (Navajas); 51 El Jacal, 9618 ft.; 52 El Zembo, 7062 ft.; 53 Hacienda de San Miguel, 6666 ft.; 54 Hacienda de Regla, 6216 ft.; 55 **Atotonilco el Grande** (Totonilco el Grande), 6756 ft.; 56 Dantoe, Cueva de (Puente de la Madre de Dios), 5310 ft.; 57 La Magdalena, 6036 ft.; 58 **Actopan**, 6264 ft.; 59 Mamanchota (Los Organos de Actopan), 8982 ft.

Between Mexico city and Guanajuato, Aug.-Sept. 1803.

(See H.B.K. Nov. Gen. vii. 434; Humb. et Bonpl. Voyage, Atlas Géogr. t. 30, Mex. tt. 1, S. half, 3, 14; Admiralty Intell. Div. 1205, Handbook of Mexico, 350.)

60 Tlanepantla (Tanepantla); 61 Cuesta de Varientos, 7266 ft.; 62 Guautitlan (Huautitlan); 63 **Huehuetoca** (Gueguetoque), 7068 ft.; 64 Cerro de Sincoq; 65 Cerro de Nochistongo; 66 Puerto de Reyes, 7248 ft.; 67 **Tula**, 6318 ft.; 68 Hacienda de San Antonio, 6726 ft.; 69 Calpulalpan, 8274 ft.; 70 Arroyozarco, 7770 ft.; 71 **San Juan del Rio**, 6084 ft.; 72 Hacienda de Lira, 5970 ft.; 73 Cuesta de la Noria, 6498 ft.; 74 **Querétaro**, 5970 [5947] ft.; 75 Zelaya (**Celaya**), 5646 ft.; 76 El Molino de Sarabia, 5502 ft.; 77 **Salamanca**, 5406 [5646] ft.; 78 Temascatio, 5574 ft.; 79 Marfil, Cañada de; 80 **Guanajuato**, 6414 [6600] ft.; 81 Valenciana, Mina de, 7116 ft.; 82 Rayas, Mina de, 6696 ft.; 83 Belgrado, Mina de, 7530 ft.; 84 Cerro de Serena, 7644 ft.; 85 Ovejeras; 86 Santa Anita; 87 La Bufa de Guanajuato; 88 Cañada de Acabuca; 89 Cubilete; 90 Gigante; 91 Santa Cruz de la Sierra; 92 Animas, Mina, 6828 ft.; 93 Mellado, Mina, 7026 ft.; 94 Puerto de Varientos, 8256 ft.; 95 Santa Rosa de la Sierra, 7746 ft.; 96 Los Joares, 8154 ft.; 97 Puerto de Santa Rosa, 8664 ft.; 98 Villalpando, Mina de; 99 Comangillo, 6600 ft. (6 m. from Silao).

Between Guanajuato and the volcano of Jorullo, Sept. 1803.

(See H.B.K. Nov. Gen. vii. 435; Humb. et Bonpl. Voyage, Atlas Géogr. tt. 28, 29, 30, Mex. t. 1, S. half.)

100 Cuevas, 6012 ft.; 101 Burras, 5682 ft.; 102 Lo de Sierra; 103 **Valle de Santiago** (Sancti Jacobi convallis) [5630 ft.]; 104 Valle de Palangeo, 5370 ft.; 105 Alberca de Palangeo; 106 Puerto de Andaracuas, 5490 ft.; 107 Yurirapundaro; 108 **Cuitzeo** (Cuiseo), Laguna de; 109 Valladolid de Mechoacan [**Morelia**] 6006 [6200] ft.; 110 Capula, 6450 ft.; 111 Chapoltepec, 6432 ft.; 112 **Patzcuaro** (Pazcuaro), 6774 [6717] ft.; 113 **Ario**, 5964 ft.; 114 Aguasarco, 4686 ft.; 115 Rio San Pedro; 116 Inguaran (Ynguaran); 117 Cerro de las Cuevas; 118 Las Playas de Jorullo, 2922 ft.; 119 Mal Pays; 120 **Volcan de Jorullo**, 4002 ft.

Between Valladolid de Mechoacan [**Morelia**] and Mexico city, Sept.–Oct. 1803.

(See H.B.K. Nov. Gen. vii. 435; Humb. et Bonpl. Voyage, Atlas Géogr., Mex. t. 1, S. half, 3; Admiralty Intell. Div. 1205, Handbook of Mexico, 341.)

121 Carpio, 5868 ft.; 122 Tepare, 5910 ft.; 123 Cinapecuaro (**Zinapecuaro**), 5808 ft.; 124 Ocambaro (**Acambaro**), 5742 [6036] ft.; 125 **Maravatio**, 6300 ft.; 126 **Tepetongo**, 7110 ft.; 127 Islahuaca (**Ixtlahuaca**), 7956 ft.; 128 Rio Sarco, 5880 ft.; 129 **Toluca**, 8274 [8761] ft.; 130 **Nevado de Toluca**, 14232 ft.; 131 Cerro de las Cruces, 9882 ft.; 132 Tianguillo, 9030 ft.

Valley of Mexico, 1803–1804.

(See H.B.K. Nov. Gen. vii. 433; Humb. et Bonpl. Voyage, Atlas Géogr., Mex. tt. 3, 15.)

133 Peñol de los Baños; 134 Guadalupe; 135 Tlatelolco, Santiago de; 136 Chapoltepec, 7150 ft.; 137 **Tezcuco**; 138 Izta-palapan; 139 Xochimilco; 140 Tlanepantla; 41 Guautitlan (Huautitlan); 142 San Christobal (S. Christophorus); 143 Carpio; 144 El Peñon (rupes).

Between Mexico city and Perote (State of Vera Cruz), Jan.–Feb. 1804.

(See H.B.K. Nov. Gen. vii. 435; Humb. et Bonpl. Voyage, Atlas Géogr., Mex. tt. i, S. half, 3, 9, 12; Admiralty Intell. Div. 1205, Handbook of Mexico, 396.)

145 Venta de Chalco, 7236 ft.; 146 Venta de Córdoba, 8154 ft.; 147 Rio Frio, 9492 ft.; 148 Ocotlan, 7206 ft.; 149 **Puebla de los Angeles**, 6750 [7100] ft.; 150 **Cholula**, 6480 ft.; 151 Llano de Tetimpa, 7404 ft.; 152 **Fopocatepetl**, 16626 ft.; 153 **Iztaccihuatl**, 14736 ft.; 154 Cocosingo; 155 El Pinar, 7854 ft.; 156 Venta de Soto, 7206 ft.; 157 **Perote**, 7242 ft.

Between Perote and Vera Cruz, Feb. 1804.

(See H.B.K. Nov. Gen. vii. 435; Humb. et Bonpl. Voyage Atlas Géogr., Mex. tt. 1, S. half, 9, 12; Admiralty Intell. Div. 1205, Handbook of Mexico, 396.)



158 Pinahuistepec, 9006 ft.; 159 **Cofre de Perote** (Nauhcampatepetl) 12582 ft.; 160 El Manzanillo (Barranca Honda); 161 Las Vigas, 7332 ft.; 162 Cuesta del Soldado, 5892 ft.; 163 La Pileta, 4740 ft.; 164 La Banderilla, 4500 ft.; 165 **Xalapa (Jalapa)**, 4062 [4681] ft.; 166 Rio Chachalacas; 167 Cerro de Macultepec, 4728 ft.; 168 **Orizaba**, 16302 ft.; 169 Encero, 2976 ft.; 170 La Rinconada, 834 ft.; 171 La Antigua; 172 **Vera Cruz**.

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### III.—MISCELLANEOUS NOTES.

The following appointments have been made by the Secretary of State for the Colonies :—

MR. L. P. HENDERSON, B.Sc., to be Agricultural Instructor, Training College, Tanjong Malim, Federated Malay States; LIEUT. J. H. HUNTER, M.A., B.Sc., to be Agricultural Instructor, Njala Agricultural College, Sierra Leone; CAPTAIN C. W. J. LINE, B.A., Dip.Agric., to be Deputy Director of Agriculture, Gambia; LIEUT. D. H. URQUHART, B.Sc., to be Superintendent, Agricultural Department, Nigeria.

THOMAS FREDERICK CHEESEMAM.—The death of Mr. T. F. Cheeseman, F.L.S., F.Z.S., which was recorded in the last number of the *Bulletin* for 1923, removes a personality which has dominated New Zealand botanical research for the last half century.

Mr. Cheeseman was born at Hull, Yorkshire, in 1846, and accompanied his parents to Auckland in 1854, where he completed his education. After leaving school he spent some years in studying botany, in the course of which he explored the North Island and laid the foundations of his later work on the New Zealand flora and vegetation. Locally he was identified with the Auckland Museum almost from its inception, and his wide knowledge of natural history, in addition to the special subject of botany, enabled him in his capacity as Curator, which post he held since 1874, to build up the interesting and valuable collec-

tions for which not only Auckland but New Zealand generally is indebted. In a letter to Kew in 1921 he states how gratified he was at the donations which had made possible the building of a new Museum as a War Memorial, to which he was presenting his own splendid herbarium. Unfortunately he was not destined to see this project completed.

Mr. Cheeseman had for many years been a frequent and intimate correspondent of Kew and an occasional contributor to the *Kew Bulletin*. He had also from time to time sent herbarium specimens and seeds of plants of interest to the Kew collections.

His principal contributions to the study of the New Zealand flora, of which he was an acknowledged authority, are:—A Manual of the New Zealand Flora, Illustrations of the New Zealand Flora, Botany of the Three Kings Islands, Flora of the Kermadec Islands, Systematic Botany of the Islands to the South of New Zealand, Vascular Flora of Macquarie Island, and the Flora of Raratonga.

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DR. C. F. MILLSPAUGH.—We have to record with sincere regret the death of Dr. Charles Frederick Millspaugh in his 70th year, on September 15th, 1923, after a six months' illness.

Dr. Millspaugh was a nephew of Ezra Cornell, the founder of Cornell University, and had devoted much time to botanical exploration, especially in Mexico, Brazil and the Antilles. He had been Curator of the Department of Botany in the Field Museum of Natural History at Chicago for nearly thirty years and was on the most friendly terms with Kew, spending several days in the Herbarium during his visit to Europe in 1922.

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J. H. TURNER.—We regret to learn of the death of Mr. J. H. Turner, which took place on the 9th of December last at Richmond, Surrey.

It was to Mr. Turner's kindly interest as Agent-General for British Columbia that Kew is indebted for the fine Douglas fir flagstaff which is such a striking and interesting feature in the Gardens.

Although it actually replaced the old flagstaff when the latter had to be taken down, Mr. Turner had previously originated the idea of obtaining a specimen of a British Columbian tree for public exhibition in London. On learning, however, that Kew was without a flagstaff he at once arranged for this new tree to be sent to the Gardens, where it was erected on the 18th October, 1919 (*K.B.* 1919, p. 393).

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**Visitors during 1923.**—The number of visitors to the Gardens in 1923 was 1,186,662. This was an increase of 42,904 over those recorded for the previous year.

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**Garden Operations, 1923.**—ROSES. In last year's report on Garden Operations during 1922 (*K.B.* 1923, p. 44) mention was made of the fact that a commencement had been made to transform the planting of the sunken area south-west of the Palm House from a miscellaneous collection of shrubs to an extension of the rose garden already existing in the neighbourhood. The work has now been completed, the beds having been furnished with new soil and planted with a selection of good varieties of garden roses. The roses planted last year succeeded well, and as each bed was underplanted with violas they gave a very attractive display of colour much appreciated by visitors during summer and autumn. There is now in the Palm House area a representative collection of these roses. The number of beds is 113, each bed being planted with a single variety, the number of plants in each bed varying from 24 to 110. The total number of plants grown is approximately 6,000. Visitors or students interested in roses have three other areas in Kew available to them: there is the pergola near the Rock Garden where climbing varieties are grown; the Rose Dell near the Pagoda, devoted to the ramblers; finally the botanical collection of species and wild varieties.

The broad gravel walk which traversed that section of the Sion Vista occupied by the sunken area alluded to in the previous paragraph—the last remnant of the gravel walk which once extended the whole length of the vista as it was planned by Nesfield in 1845—has been grassed over. An expanse of turf, broken only by four crosspaths of gravel, now stretches from the Palm House steps to the Thames boundary—about 1000 yards.

**COLLECTION OF ERICACEAE.** The introduction of many new species of rhododendrons from China by Messrs. Forrest, Kingdon Ward and Farrer has rendered necessary the provision of more space for them. The botanical collection of the heath family is grown near King William's Temple, and the last of the miscellaneous shrubberies there has now been appropriated. This is the tongue-shaped piece of ground sloping from the temple towards the Temperate House. A fine example of *Ailanthus glandulosa* stands in the centre, round the trunk of which a wooden seat for the convenience of visitors has been placed, reached by two grassy paths. At the base of the slope a terrace has been built approached by steps that balance those of the Himalayan House at the other end of the straight walk bordered by boxes, lilacs and Phillyreas (*I.* 8 on Key-plan).

The gravel walk on the west side of the Water-lily house (No. 15) has been carried all round it so that visitors on the lawn between the Broad Walk and this house may reach it without having to make the detour previously necessary.

**RAIN-WATER TANKS.** Arising out of the disastrous effects of saline water from the Thames on the plant collections during 1921,



an adequate system of tanks for the collection and storage of rain water has been installed in the plant houses by H.M. Office of Works. From the horticultural point of view this is the most beneficial thing conferred on the establishment for many years. Gardeners have long known that the best of all water for plants is that which falls from the skies. Up to this year it has, except in the Palm House, Temperate House and Ferneries, been allowed largely to run to waste. A distinct improvement in the health of many of our indoor collections is already manifest. Although it needed the drought of 1921—unprecedented since Kew became a public institution—to bring the matter to a head, there is no doubt that during previous and lesser droughts saline matter in the Thames water has caused ill-health to the plants without the real cause being known, being attributed instead to negligence or unskilful treatment.

The effects of the same drought on the old trees in the grounds are still unhappily too apparent; several fine old beeches, planted no doubt in the 18th century during the time of Queen Caroline, died during the summer and have had to be uprooted. A regrettable loss, too, is that of the large old willow oak (*Quercus Phellos*) which stood on the lawn south of the T. Range (E. 10 on the Key Plan). This tree, whose trunk was about 12 feet in girth, is mentioned by Elwes and Henry in the "Trees of Great Britain and Ireland" as one of the finest specimens in the British Isles. The trunk was quite decayed and hollow in the centre and the wrenching off of two large limbs during an autumn gale completely ruined it. The species is still represented at Kew by a smaller but fine and perfectly healthy tree on the Palace Lawn, as well as by others in the Oak collection.

The tropical fernery has been repainted and much of the roof repaired. The orchid houses and several small private houses have also been repainted.

A very interesting tree which flowered at Kew in July, for the first time it is believed under cultivation, was *Cladrastis tinctoria* Hemsley. It was originally discovered in Szechuan, in 1890, by Mr. E. A. Pratt, but not introduced until 1901, when Mr. E. H. Wilson sent home seeds from Hupeh to Messrs. Veitch at the Coombe Wood Nursery. The flowers, numerous borne in terminal panicles, are white and fragrant. Blossoming as it does in late July, the species promises to become a valuable flowering tree, and Kew is fortunate in possessing three healthy specimens. A flowering spray was figured in the Gardeners' Chronicle for August 4th, 1923 (fig. 27).

Two of the largest plants in the Succulent House flowered during the year, viz.—*Agave atrovirens* var. *latissima* and *Furcraea cubensis* var. *Lindenii*.

In the Rock Garden a batch of plants of *Aster heterochaeta* raised from seeds collected during the Mount Everest Expedition made a pretty display.

During the summer most of the gravel paths at the northern or "Botanic Garden" end of the grounds were treated with hot tar and pea gravel. The initial expense in regard to plant and material is somewhat heavy, but the process will eventually prove economical owing to the saving of labour involved in the upkeep of ordinary gravel paths. The paths are also made much more comfortable for visitors to walk upon, especially during long spells of dry weather. The work will be continued during favourable weather in 1924.

ADDITIONS TO GARDENS, 1923. The number of separate consignments of living plants, seeds, etc., to the Gardens was 634, an increase of 169 on those of 1922. The most important were the following :—

- Arnold Arboretum.—Seeds and plants.
- Berlin Botanic Garden.—Collection of plants and seeds.
- Brooklyn Botanic Garden.—58 packets of seeds.
- Brussels Botanic Garden.—Collection of plants and seeds.
- Calcutta Botanic Garden.—Seeds of *Trapa bispinosa*, *Thermopsis barbata*; numerous plants, including tubers of *Amorphophallus campanulatus*.
- Cambridge Botanic Garden.—Grafts of *Platanus cantabrigensis*; plants, including *Clusia grandiflora* and hardy *Opuntia* spp.
- Copenhagen Botanic Garden.—Numerous plants and a collection of bulbs.
- Dendrological Society, Pruhanice, Prague.—Collection of trees and shrubs.
- Edinburgh Botanic Garden.—609 packets of seeds collected by Mr. G. Forrest; herbaceous and alpine plants; *Rhododendron* and *Nepenthes* spp.
- Glasgow Botanic Garden.—Numerous plants and cuttings.
- Glasnevin Botanic Garden.—Plants, including *Epidendrum congestum*.
- John Innes Horticultural Institution, Merton.—Plants.
- National Botanic Garden, Kirstenbosch, S. Africa.—Numerous seeds, including *Erica* spp.
- Kumaon Botanic Garden.—Seeds of *Holmskioldia sanguinea*.
- Lloyd Botanic Garden, Darjeeling.—308 packets of seeds.
- Ootacamund Botanic Garden.—Seeds and plants.
- Ottawa Central Experimental Station.—44 packets of seeds.
- Palermo Botanic Garden.—108 packets of seeds.
- Paris, Muséum d'Histoire Naturelle.—72 packets of seeds.
- Penang, Botanic Garden.—Tubers of *Amorphophallus* sp. and Wardian cases of plants.
- Peradeniya, Royal Botanic Garden.—Seeds, including *Hevea brasiliensis*.
- Pretoria, Division of Botany.—Bulbs, *Urginea macrocentra*.
- Royal Botanic Society of London.—*Cocos nucifera*.
- Royal Horticultural Society, Wisley.—Plants.
- Sapporo Botanic Gardens, Japan.—64 packets of seeds.

- Singapore Botanic Gardens.—Dwarf Coconuts, Wardian cases of native plants.
- St. Louis Botanic Garden.—Tubers of *Nymphaeas*.
- Sydney Botanic Gardens.—Seeds including *Acacia Bidwillii*, *Eucalyptus erythrocorys*.
- Tiflis Botanic Garden.—60 packets of seeds.
- Tokio Botanic Garden.—91 packets of seeds.
- Trinidad, Dept. of Agriculture.—Seeds, including *Melinis minutiflora*, and Wardian case of plants.
- United States Dept. of Agriculture.—Seeds and plants.
- Zurich Botanic Garden.—63 packets of seeds and numerous plants, including *Prinsepia utilis*.
- Mr. B. C. Aston, Wellington, N.Z.—Seeds.
- Miss Balfour, Whittingehame.—Seeds, *Eucalyptus whittingehamensis*.
- Mr. A. C. Bartholomew, Reading. —Herbaceous plants and seeds.
- Mr. E. E. Battiscombe, Nairobi.—Seed of *Huernia* sp.
- The Belize Estate and Produce Co., Ltd., London.—Suckers of "Silk Grass" from British Honduras.
- Mr. J. Bintner, Luxemburg.—Collection of Hydrangeas.
- Col. Bird, Australia.—Seeds of Australian plants.
- The Bishop of Northern Rhodesia.—Bulbs and tubers.
- Mr. E. A. Bowles, Waltham Cross.—Plants and cuttings.
- Mr. W. H. Boyle, Annesley.—Case of Javanese orchids.
- Mr. D. Brodie, Abyssinia.—Seeds of Abyssinian plants including *Kniphofia* spp., *Rosa sancta*, etc.
- Mr. N. E. Brown, Kew.—Plants and seeds of Cape succulents.
- Lt.-Gen. Sir A. G. F. Browne, Farnham.—Orchids.
- Mr. A. K. Bulley, Neston.—Alpines.
- Mrs. Burgmann, Natal.—Seeds, *Lilium* sp. ?; tubers, *Lissochilus* sp. ?
- Mr. W. J. Burstow, Brighton.—Plants, *Hymenophyllum tunbridgense*.
- Mr. J. Burt Davy, Kew.—Seeds of *Vigna Rogersii*.
- Major W. F. Chipp, Simla.—Seeds of Himalayan plants.
- Mr. H. E. Chubb, London.—Case of Orchids from South America.
- Dr. L. Cockayne, Wellington, N.Z.—84 packets of seeds of New Zealand plants.
- Sir Jeremiah Colman, Bt., Gatton Park.—Orchids.
- Mr. H. Correvo, Geneva.—Seeds of Alpines.
- Mr. R. Cory, Cardiff.—Seeds and plants.
- Mr. M. T. Dawe, Sierra Leone.—Plants of *Crinum natans* and orchids; numerous seeds.
- Donard Nursery Co., Ireland.—Hardy trees and shrubs.
- Major A. A. Dorrien-Smith, Tresco.—Trees and shrubs.
- Mr. C. Eley, East Bergholt.—Rhododendrons.
- Miss F. Gallaher, London.—Large plant, *Trichomanes radicans*.
- Hon. Vicary Gibbs, Aldenham.—Trees, shrubs and herbaceous plants.
- Messrs. R. Gill and Sons, Falmouth.—Himalayan Rhododendrons.



- Dr. J. Goffart, Tangier.—Seeds, *Acacia* spp.; *Testudinaria elephantipes*.
- Mr. E. E. Gunther, Hawkhurst.—Seeds and plants of succulents.
- Mrs. M. C. Hammond, Salisbury.—*Pelargonium Cotyledonis* from St. Helena.
- Commendatore C. Hanbury, La Mortola.—224 packets of seeds.
- Mr. R. R. Hayes, Ambleside.—Hardy heaths.
- Marquis of Headfort, Kells, Co. Meath.—Seedling Rhododendrons; seeds of *Pieris taiwanensis*.
- Mr. W. L. Heape, Somaliland.—Seeds of *Cordeauxia edulis*.
- Prof. A. Henry, Dublin.—Seeds of trees and shrubs.
- Mr. J. Hers, China.—99 packets of seeds.
- Mr. R. Hickel, France.—*Populus Hickeliana*.
- High Commissioner for New Zealand.—Seeds of *Olearis insignis*.
- High Commissioner for the Union of South Africa.—Collections of Cape plants.
- Messrs. Hillier & Sons, Winchester.—Trees and shrubs.
- H.H. the Maharaj Rana of Jhalawar, Rajputana.—Plants.
- Sir G. Holford, Westonbirt.—68 Hippeastrums in variety.
- Mr. B. H. Horsley, Somaliland.—Seeds of *Cordeauxia edulis*.
- Miss Jones, Clevedon.—Miscellaneous South African plants and seeds.
- Mr. R. Kett, Thrace.—Bulbs and seeds from Gallipoli.
- Dr. A. F. G. Kerr, Siam.—*Dendrobium ciliatum*; seeds and tubers of Siamese plants.
- Capt. F. Kingdon Ward.—60 packets of seeds.
- Mr. C. H. Lankester, Costa Rica.—Orchids, seeds and fern spores.
- Mrs. Lee Milne, Sierra Leone.—Orchids.
- Mr. J. Leighton, S. Africa.—Cape plants, including *Cyrtanthus Leightoni*.
- Mr. G. W. E. Loder, Brighton.—Numerous plants and cuttings.
- Miss Mason, Rondebosch, S.A.—Seeds and bulbs of Cape plants.
- Sir J. Stirling Maxwell, Bart., Pollokshaws, Glasgow.—Rhododendrons.
- Mr. J. A. McPherson, Kew.—79 packets of seeds of New Zealand plants.
- Lt.-Col. Messel, Nymans, Haywards Heath.—Trees and shrubs.
- Mr. C. T. Musgrave, Godalming.—Seeds and plants of Alpines, etc.
- Mr. W. Napier Church, Sandhurst.—Plant, *Phoenix Roebelinii*.
- The O'Mahony, Coolballintagart.—Plants.
- Major A. Pam, Broxbourne.—Bulbs from Asia Minor, and Peruvian seeds.
- Mr. R. N. Parker, Dehra Dun.—Seeds of Indian plants, including *Jasminum Parkeri*.
- Mr. E. E. Pescott, Melbourne.—Collection of seeds, including *Bossiaea Laidlawiana*.
- Mr. N. S. Pillans, S. Africa.—Cape plants, including *Mesembryanthemum Pillansii*.
- Mr. W. R. Price, London.—Pleiones.
- Dr. A. Ragionieri, Italy.—Roots of Florentine Ranunculus.

- Sir J. Ramsden, Gerrards Cross.—*Gladiolus* spp. from Kenya Colony.
- Mr. G. Reuthe, Keston, Kent.—Hardy trees and shrubs, and *Telopea truncata*.
- Mrs. V. Rey, Hyde Park.—*Aloe* spp. and *Scilla* sp. from Abyssinia.
- Lt.-Col. M. B. Roberts, Barnes.—28 orchids from Manipur State, Assam.
- Dr. J. N. Rose, Washington.—*Sedum* spp., *Lenophyllum guttatum*.
- Sir John Ross of Bladensburg, Rostrevor.—Seed of *Clethra Delavayi*.
- Major L. de Rothschild.—Seed of *Daubentonia Tripetii*; plants of Rhododendrons and Liliums.
- Messrs. Rowntree & Co., Ltd., York.—Plants, *Theobroma Cacao* vars.
- Dr. Scale, Bath.—Seeds from New South Wales.
- Mr. T. Sharp, Westbury.—Seeds and seedlings, including *Aloe Thornecroftii*.
- Mr. H. Steedman, W. Australia.—Seeds, including *Eucalyptus erythrocorys*.
- Mr. J. B. Stephenson, Ascot.—A collection of Rhododendron seedlings raised from Capt. Kingdon Ward's seeds.
- Messrs. Sutton & Sons, Reading.—10 varieties of *Cyclamen*.
- Mr. C. F. M. Swynnerton, Tanganyika.—*Aloe* sp. from Tanganyika.
- Mr. E. Taylor, Tunbridge Wells.—Plants and cuttings of succulents.
- Mr. C. G. Teschemaker, New Zealand.—Seeds of *Notospartium torulosum*.
- Mr. G. Thornecroft, Barberton, S.A.—Seeds of Transvaal plants.
- Dr. A. H. Unwin, Cyprus.—Seed of *Cedrus Libani* var. *brevifolia*.
- Messrs. Vilmorin-Andrieux & Cie., Verrières le Buisson, France.—59 packets of seeds collected by J. Hers in Honan Prov. China, and numerous packets of miscellaneous seeds.
- Mr. D. Vyvyan, Natal.—*Encephalartos Frederici-Guilielmi*.
- Mr. F. G. Walsingham, Egypt.—*Nelumbium speciosum* (white form).
- Mr. O. E. Warburg, London.—Herbaceous plants, shrubs, rare British plants.
- Mr. J. C. Williams, Caerhays.—259 packets of seeds, including *Enkianthus quinquefolius*, and plants of numerous species of *Rhododendron*.
- Mr. P. D. Williams, Lanarth.—Rhododendrons.

Surplus plants from the various collections were distributed as usual, either in exchange with botanic gardens, nurserymen, etc., or as gifts to teaching institutions. The total number of packets of seeds distributed was 2,849 of hardy trees and shrubs, and 4,779 of hardy herbaceous plants. The most important of the seeds obtained for special distribution were *Jasminum Parkeri*, *Melinis minutiflora* (Efwatakala grass), *Cedrus Libani* var. *brevifolia*, *Holmskioldia sanguinea*, *Juniperus Cedrus*, *Cordeauxia edulis* (Yeheb Nut), and *Juniperus bermudiana*. Seeds

of *Trapa bispinosa* were grown at Kew and plants were distributed to the leading botanical institutions.

Wardian cases of plants were sent to the Botanic Gardens of Trinidad, Singapore, Bangalore, Amani Institute, Tanganyika Territory, and to the Gambia Department of Agriculture.

The recipients of plants, etc., from Kew, included the following :—

King's College, Cambridge.—Trees and shrubs.

Arnold Arboretum, Mass., U.S.A.—Seeds, plants and cuttings of hardy trees and shrubs.

Edinburgh Botanic Garden.—Plants, cuttings and seeds, including *Jasminum Parkeri*, *Arundinaria Murielae*, and *Nepenthes* spp.

Estates Department, Pretoria, S.A.—Cuttings of *Salix caerulea*.

Glasgow Botanic Gardens.—Collection of tropical plants and seeds.

Forestry Commission.—3265 cuttings of *Populus* and *Salix* spp.

Imperial War Graves Commission.—Plants of *Acer rubrum*, *A. macrophyllum*. Seeds of *Eucalyptus whittingehamensis*

Messrs. Sutton & Sons, Reading.—*Primula calciphila*, collection of Begonias, etc.

Horticultural College, Swanley.—Stove and greenhouse plants.

School of Tropical Medicine, Liverpool.—Seed of *Melinis minutiflora* (Efwatakala Grass).

Hon. Vicary Gibbs, Aldenham.—Hardy trees and shrubs.

New York Botanic Garden.—Cuttings of *Anthurium* spp.

Mr. P. D. Williams, Lanarth.—Rhododendrons and hardy trees and shrubs.

Glasnevin Botanic Garden.—Collection of stove and hardy plants.

Dr. I. B. Henry, Reading.—*Theobroma Cacao* vars., *Hevea brasiliensis*, etc.

Prof. Poirault, Antibes.—Collection of fern spores.

Oxford Botanic Garden.—Cuttings of *Salix caerulea*, collection of tropical ferns.

Department of Agriculture, Melbourne.—Seeds of *Lilium* spp.

Cambridge Botanic Garden.—Hardy shrubs.

Singapore Botanic Garden.—Large collection of succulents.

Miss Willmott, Great Warley.—Herbaceous and Alpine plants.

Dr. B. Moiser, Kaduna, Nigeria.—Collection of bulbs and seeds.

Punjab Dept. of Agriculture, Lyallpur.—Seeds of *Acacia* spp.

Earl of Leicester, Holkham.—Hardy trees and shrubs.

Petrograd Botanic Garden.—Seeds, *Victoria regia*.

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**Museums.**—The past year has been a busy one for the staff in clearing up accumulations of products of doubtful origin and, in conjunction with Mr. L. A. Boodle, Assistant Keeper of the Jodrell Laboratory, in dealing with the large amount of material submitted for determination and report by commercial firms, scientific institutions and correspondents in all parts of the



world. In addition, much time and attention has been devoted to visitors to the Museums, including students, seeking information upon special subjects. It is also gratifying to record that, as in previous years, many parties of school children, accompanied by their teachers, have visited the collections. Three special exhibits that attracted considerable attention were made during the year, viz., Ancient Egyptian Wreaths etc., Sports Requisites and Nigerian Dyes. All available time has been devoted to improving generally the permanent collections, to which many interesting products have been added, and duplicate material has been distributed to the following institutions; the Pharmaceutical Society: Goldsmith's College, New Cross: Department of Botany, Marischal College, Aberdeen: The Universities of Aberystwyth and Manitoba and to the Winton Laboratories, Conn., U.S.A., and others. Official visits were made by the Keeper of Museums to Hull and to Copenhagen for the Museums Association Annual Conference, and by Mr. Dallimore to French forests with the Royal English Arboricultural Society.

PRESENTATIONS TO MUSEUMS. The following miscellaneous specimens have been received:—

Mr. N. E. Brown, Kew Gardens. —Sticks of Deal as used for making matches between 1830 and 1840.

Captain R. W. Brent, Gold Coast. —Sample of Sindru bark (*Alstonia congensis* Engl.).

Professor H. G. Greenish, Pharmaceutical Society. — A collection of miscellaneous drugs.

Director, Botanic Gardens, Singapore. —Thirty three specimens of Malayan timbers.

The Right Hon. the Earl of Yarborough, Brocklesby Park, Lincolnshire. —Two creosoted posts and four rails from a fence erected 17 years ago.

Mr. J. S. Gamble, East Liss, Hants. —Culms of *Neohouzeaua Helferi* Gamble, Burma.

Mr. A. C. Bartlett, Kew. —Sections of stems of *Elaeagnus* sp., *Prunus Pissardi* Carr, *Laburnum vulgare* J. S. Presl., and *Robinia Pseudacacia* L. var.

Curator, Royal Botanic Garden, Calcutta. —Seeds of *Holmskioldia sanguinea* Retz.

The New Liverpool Rubber Co., Ltd. —Examples of rubber-soled shoes.

Mrs. Vera Higgins, East Croydon. —Specimen of Jangada wood (*Apeiba Tibourbou* Aubl.).

Mr. F. Tracey, Colombia. —Fibre from leaves of "Cumare" palm (*Astrocaryum vulgare* Mart.), Orinoco region, Colombia.

Mr. G. F. Eeles, Anglemont, British Columbia. —Plant and fruits of Soapallaly (*Shepherdia canadensis* Nutt.) from British Columbia.

Curator, Botanic Gardens, Dominica. —Photographs of *Taraktogenos Kurzii* King and *Pouteria suavis* Hemsl. in Botanic Gardens, Dominica.

Rev'd. E. H. Goddard, Clyffe Vicarage, Swindon.—Ball of *Posidonia australis* Hook. f. from Adelaide.

Assistant Commissioner of Forestry for Scotland, Edinburgh.—Eight photographs of Forestry operations in Scotland.

Mr. J. W. Egerton, Sudbury.—Flower head and cone of *Banksia prionotes* Lindl. and carved Coconut shell.

Conservator of Forests, Sandakan, British North Borneo.—Sixty specimens of Borneo woods and six pamphlets upon Forestry subjects.

Miss T. Hicks, Derby.—Four photographs to illustrate the transplanting of a large tree.

Professor Percy Newberry.—Walking sticks, bow and throw stick from ancient tombs at Thebes.

Mr. H. M. O'Byrne, British Somaliland Protectorate.—Wood and bark of *Juniperus procera* Hochst.

Director of Agriculture, Zanzibar.—Root specimens of *Cassia Beareana* Holmes.

The Merchant Trading Co., Bishopsgate, London, E.C.—Plank of "Bagac" wood (*Dipterocarpus* sp.) from the Philippines.

Messrs. John Lenanton & Son, Ltd., Millwall, London.—Twelve sections of Malayan timbers.

Mr. W. Mathieson, Minchinhampton, Gloucester.—Photograph of a large Alder (*Alnus glutinosa* Medic.) growing at Shepscombe, Gloucester.

The Khartoum Museum, through Mr. R. E. Massey, Khartoum.—Fragment of cotton cloth from Egyptian tombs.

**Research in Jodrell Laboratory in 1923.**—Mr. L. A. Boodle made observations on the foliage of *Ampelopsis* seedlings, and carried out some experiments on the germination of pollen-grains and Fern-spores under different conditions.

Mr. R. N. Chrystal continued his studies on the life-history and feeding habits of the *Chermesidae* injurious to Silver Fir and Pine.

Mr. I. Namikawa was engaged in the completion of a research on the abscission of floral organs, dealing with the anatomy of the tissues of the separation layer, etc., and with the physiological processes concerned.

The Rev. L. D. Sayers began a study of the anatomy of species of *Chermes* and their galls.

Mr. A. Sharples carried out some work forming part of an investigation of organisms associated with Coconut bud-rot.

By arrangement with the Board of Education, a short course of instruction for Teachers in Secondary Schools was held at Kew from August 9-22. The course, attended by 40 teachers, was organised by Dr. Harold Wager, F.R.S., and included lectures, practical botanical work (accommodation being given in the Lecture Rooms adjoining the Jodrell Laboratory), demonstrations in the Gardens and Museums and visits to the Herbarium and Library.

**Presentations to the Library during 1923.**—The generous and most welcome offer of the Carnegie Institution of Washington to present to Kew such of its publications as were thought desirable in a botanical library has been followed by the receipt of several valuable books issued by the Institution during the last three years. These are :—*The Cactaceae*, by N. L. Britton & J. N. Rose, vol. iii. and vol. iv., pp. 1 80; *Plant habits and habitats in the arid portions of South Australia*, by W. A. Cannon; *Aeration and air-content: the rôle of oxygen in root activity*, by F. E. Clements; *Experimental pollination*, by F. E. Clements & F. L. Long; *The phylogenetic method in taxonomy*, by H. M. Hall & F. E. Clements; *Rubber-content of North American plants*, by H. M. Hall & F. L. Long; *The behaviour of stomata*, by J. V. G. Loftfield; *Studies in plant respiration and photosynthesis*, by H. A. Spoehr & J. M. McGee; and *Development and activities of roots of crop plants*, by J. E. Weaver, F. C. Jean & J. W. Crist.

Sir William Thiselton-Dyer has presented the following :—*Recueil d'Œuvres de Léo Errera*, 1908–22, 4 vols.; *Recueil d'Articles scientifiques dédié au Professeur Clément Timiriazeff par ses Elèves*, 1916 (in Russian, with summaries of the papers in German, French or English); *Emin Pasha: his life and work*, compiled by G. Schweitzer, 1898, 2 vols.; *Manuel technique de physiologie végétale*, by W. Detmer (French edition of 1890); *George, Duke of Cambridge: a memoir*, edited by E. Sheppard, 1906, 2 vols.; *Richmond on the Thames* (No. 27 of *The Portfolio*), by R. Garnett, 1896; *The Good Queen Charlotte*, by Percy Fitzgerald, 1899; *A Companion to Latin Studies*, edited by Sir J. E. Sandys, 3rd edition, 1921, containing an article on Flora (pp. 66–89), by Sir William; 5 pamphlets and several original letters.

The Trustees of the British Museum have presented the *Catalogue of the Books . . . in the British Museum (Natural History)*, Supplement, A–I, which forms vol. vi. of the work; *A Handbook to the larger British Fungi*, by J. Ramsbottom; and the Report on the Lichens of the British Antarctic ("Terra Nova") Expedition, 1910, by O. V. Darbishire.

From the Secretary of State for the Colonies have been received :—*Dates and date cultivation of the 'Iraq*, by V. H. W. Dowson, pt. 3; *The principal agricultural pests of Jamaica*, by C. C. Gowdey; and *Richard Schomburgk's Travels in British Guiana*, 1840–44, translated and edited by W. E. Roth, vol. i–ii., 1922–23.

The Secretary of State for India has presented *The English Factories in India*, 1861–64, by W. Foster; and the fifth part of *The Flora of the Presidency of Madras*, by J. S. Gamble. A second copy of the last named work has been presented by the author.

The presentations through the Crown Agents for the Colonies include :—*The forest officers' handbook of the Gold Coast, Ashanti and the Northern Territories*, by T. F. Chipp; *Gold Coast Hand-*



book, 1923; and Dr. E. O. Teale's Final Report of the Geological Survey of Tanganyika Territory, 1922.

Dr. N. L. Britton has continued to send to the library the *North American Flora*, of which four parts were received during the year, and other publications of the New York Botanical Garden.

A complete set of Hooker's *Flora of British India*, which formerly belonged to the late Mr. J. Ramsay Drummond, has been presented by his son, Mr. J. Montagu F. Drummond.

Presentations by Lieut.-Col. Sir David Prain include :—*Travaux du Laboratoire de Matière médicale de la Faculté de Pharmacie de Paris*, tome xiv.; *Webbia*, vol. v. pt. 1; and the year's issues of the *Proceedings of the American Philosophical Society*, *Bulletin de la Société botanique de France*, and *Berichte der Deutschen Botanischen Gesellschaft*.

Two contributions to a comparative study of the flora of the Scottish lakes, by G. West, 1905 & 1910, have been presented by Mr. N. E. Brown, also *Les Anthurium*, by E. Bergman, ed. 2, 1891, and *Experiments to show how failure under stress occurs in timber*, by A. R. Fulton, 1922.

Prof. Hans Schinz has presented the first part of the fourth edition of his and Prof. Keller's *Flora der Schweiz*, and a large collection of dissertations and other papers.

The following which, unless otherwise stated, were presented by their authors or editors and published in 1922 or 1923, have been received :—*Alberti Magni de vegetabilibus libri VII.*, ed. E. Meyer & C. Jessen, 1867, from the Bentham Trustees; Oakes Ames, *Schedulae Orchidiana*, Nos. 2-6; G. E. Anastasia, *Le forme elementari della composizione dei vegetali o l'origine della specie*, pt. 2; L. H. Bailey, *Gentes Herbarum*, vol. i. fasc. 2 & 3; W. F. Bewley, *Diseases of glasshouse plants*, from Messrs. Benn Brothers; J. M. Black, *Flora of South Australia*, pt. 1; J. Borg, *Cultivation and diseases of fruit trees in the Maltese Islands*; H. M. Bunbury, *The destructive distillation of wood*, from Messrs. Benn Brothers; C. de Candolle, *Piperacearum clavis analytica*, from Major-General R. de Candolle; L. Cockayne and others, *New Zealand Nature Notes*; W. Dallimore & A. B. Jackson, *Handbook of Coniferae including Ginkgoaceae*, from Mr. W. Dallimore; R. Descharmes, *Bibliographie des travaux scientifiques publiés par les sociétés savantes de la France*, tome ii., 1re livraison, from Ministère de l'Instruction publique, Paris; G. B. De Toni & A. Forti, *Alghe di Australia, Tasmania e Nuova Zelanda*, raccolte dal Rev. Dott. G. Capra nel 1908-1909, from Mr. A. D. Cotton; L. Diels, *Beiträge zur Kenntnis der Vegetation und Flora der Seychellen* (Valdivia Expedition); H. B. Dobbie, *New Zealand Ferns*, ed. 2, 1921, from the Editor of *Nature*; G. Forrest, *Details of specimens of Rhododendron found . . . in 1922*, from Mr. J. C. Williams; P. F. Fyson, *The Indian species of Eriocaulon*, 1921-23; N. T. Giung, *Contribution à l'étude anatomique des téguments séminaux des Légumineuses exotiques*; D. F. de S.

Gunerathne, *List of Plants in the Henaratgoda Botanic Gardens, Gampaha, Ceylon*, from the Director of Agriculture, Ceylon; U. P. Hedrick, *The Pears of New York*, 1921; E. Janchen, *Die in Deutschland und Österreich an wissenschaftlichen Anstalten wirkenden Botaniker*, from Dr. Otto Stapf; H. O. Juel, *Studien in Burser's Hortus siccus*; H. Knoche, *Flora Balearica*, vol. iii. & iv.; S. H. Koorders, *Supplement op het Eerste Overzicht der Flora van N. O. Celebes*, Deel ii. & iii., uitgegeven door . . . A. Koorders-Schumacher; J. H. Lace, *List of trees, etc. recorded from Burma*, ed. 2, revised by G. Rodger; T. S. Lindsay, *Plant names*, from the Sheldon Press; C. von Linné, *Bref och Skrifvelser af och till Carl von Linné*, Afdeln. 1, del viii. utgifna . . . af J. M. Hulth, from the Royal University of Upsala; J. H. Maiden, *Critical Revision of the genus Eucalyptus*, pts. 57-60; J. H. Maiden, *Forest Flora of New South Wales*, pts. 71-74, from the Secretary for Agriculture, Sydney; U. Martelli, *Webbia*, vol. v. pt. 2; *Menzies' Journal of Vancouver's Voyage, April to October, 1792*, edited by C. F. Newcombe; E. D. Merrill, *Enumeration of Philippine Flowering Plants*, 11 fascicles; C. F. Millspaugh & L. W. Nuttall, *Flora of Santa Catalina Island, California*, 2 copies, from the Field Museum, Chicago; K. Miyabe & Y. Kudo, *Icones of the essential forest trees of Hokkaido*, fasc. 7-9, from the Governor of Hokkaido; M. Miyoshi, *The plant world of Japan*, 1910, from Dr. Otto Stapf; J. J. Nock, *List of Plants in the Botanic Gardens, Hakgala, Ceylon*, from the Director of Agriculture, Ceylon; W. Nowell, *Diseases of Crop Plants in the Lesser Antilles*; Alice M. Ottley, *Revision of the Californian species of Lotus*; C. E. Parkinson, *Forest Flora of the Andaman Islands*; P. Vanpruk Picharn, *List of common trees, &c. in Siam*, from the Royal Forest Department of Siam; S. J. Record, *Bibliography of the woods of the world*, ed. 2; H. N. Ridley, *Flora of the Malay Peninsula*, vol. i. & ii., from the Government of the Straits Settlements and F.M.S.; J. Roscoe, *Twenty-five years in East Africa*, 1921, from Mr. J. Burt Davy; Principe Sant' Antimo, *Le Palme di Villa Lucia*, 1920; E. Graf Silva Tarouca & C. Schneider, *Unsere Freiland-Laubhölzer*, ed. 2, and *Unsere Freiland-Nadelhölzer*, ed. 3, both from Mr. W. J. Bean; J. B. Stevenson, *Rhododendrons found by F. Kingdon Ward*, 1913-22; H. Stone, *Text-book of wood*, 1921; C. Vermoesen, *Manuel des essences forestières du Congo belge*, from Directeur Général de l'Agriculture au Ministère des Colonies, Brussels; J. Levêque de Vilmorin, *L'hérédité chez la Betterave cultivée*; C. T. White, *An elementary text-book of Australian forest botany*, from the Forestry Commission of New South Wales; E. H. Wilding, *Rhododendrons: their names and addresses*; R. C. Wren, *Potter's Cyclopaedia of botanical drugs and preparations*, ed. 3, from Messrs. Potter & Clarke.

Of societies, academies and other institutions which have sent their publications to Kew during the year, and which have not been already mentioned, the following are the more important:—Royal Swedish Academy of Sciences; Danish Botanical Society;

Czechoslovak Botanical Society of Prague; Department of Agriculture of the Union of South Africa; Agricultural Research Institute, Pusa; Indian Tea Association, Calcutta; Department of Agriculture, Buitenzorg; Bureaus of Science, Agriculture and Forestry, Philippine Islands; Smithsonian Institution, Washington; U.S. Department of Agriculture; Arnold Arboretum; Missouri Botanical Garden; California Academy of Sciences and University of California. The following have also been received as presentations:—*Acta Horti Bergiani*, tom. vii., from Prof. R. E. Fries; *Bothalia*, vol. i. pt. 3, from Dr. I. B. Pole Evans; *British Guiana Handbook*, 1922, from the Committee of Correspondence, &c., R. Agric. Soc., British Guiana; *Bulletins of the Agricultural Department, Nigeria*, from the Director of Agriculture; *Japanese Journal of Botany*, from the National Research Council of Japan; *Mededeelingen van het Proefstation voor Thee*, Buitenzorg (21 numbers) and *De Thee* (4 vols.), from Director of the Station; *Official Year-Book of the Union of South Africa*, 1922, from the High Commissioner; *Orchid Review*, from the Editor, Mr. Gurney Wilson; *Report of the British Association for the Advancement of Science*, 1922, from Miss E. M. Wakefield; *Report of the Lands and Forests Department, Sierra Leone*, 1922, from Mr. M. T. Dawe; and *A Census of the Plants of Victoria*, from the Field Naturalists' Club of Victoria, Australia.

Very numerous excerpts from journals and other publications, and dissertations, have been received. The principal contributors of these were:—Mr. Oakes Ames, Prof. P. A. van der Bijl, Dr. V. F. Brotherus, Dr. P. Brühl, M. H. Chermezon, Prof. R. Chodat, Dr. E. De Wildeman, Prof. L. Diels, Mr. Carlos Franca, Mr. Th. C. E. Fries, Dr. H. Faes, Miss C. C. Haynes, Dr. K. Keissler, Mr. C. C. Lacaita, Prof. K. Linsbauer, Dr. R. Maire, Mr. C. V. B. Marquand, Prof. E. D. Merrill, Prof. T. G. B. Osborn, Dr. C. H. Ostenfeld, Dr. R. Pilger, Mr. G. Samuelsson, Prof. Hans Schinz, M. J. Thériot, Prof. René Viguier, Dr. Jan Vilhelm, Miss E. M. Wakefield, Director of the Botanic Gardens, Utrecht, Government Botanist of Victoria, Australia, and Chief of the Department of Pathology of the Agricultural College, Ithaca, New York.

Mr. W. F. Wilson of Honolulu has presented the December (1922) issue of *Paradise of the Pacific: Hawaii's Illustrated Magazine*, and an album of 55 excellent photographs of views and plants of Ceylon has been received from Mr. R. Oldham.

Colonel W. G. King's gift of a further collection of original paintings of Burmese plants, by the late Mrs. King, was the subject of a note in the *Kew Bulletin*, 1923, p. 404. A set of plates from *Flowering Plants of South Africa* has been presented by Dr. I. B. Pole Evans, and figures from the *Flora of the Malay Peninsula* have been presented by Mr. Ridley.

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**Report of the Herbarium, 1923.**—During the year 1923 the permanent staff was restored to pre-war strength. This enabled certain branches of work again definitely to be taken in hand.



Very heavy arrears existed, however, in practically all departments, and it was felt necessary to continue the special effort made last year to deal with some of these, notably with the large collections in the store-house. The earlier stage of such work, namely, the general sorting out, and the distribution of duplicate numbers, was therefore continued, and in the case of the following herbaria completed:—E. André (Colombia), J. R. Drummond (India), R. C. A. Prior (parts of Europe and the Orient and America), J. Cavalerie (China), W. Hancock (China). The later stage—that of determination—was pushed forward, especially with regard to the first three of the above-mentioned collections. Several smaller collections were also dealt with. As a result of this effort a very large number of sheets were named and “laid in”, and over 20,000 specimens were distributed as duplicates.

The number of specimens acquired by purchase and exchange during 1923 fell far short of that of the previous year (allowing even for the large herbarium of the late J. R. Drummond presented in 1922). The reduction in number was relatively much greater in the collections obtained by purchase.

With the vacancies in the staff filled it was again possible to allot an assistant to deal specially with the flora of Australia, and collections sent from the Commonwealth can now be dealt with promptly. Another assistant is devoting practically his whole time to the flora of China, and the work of naming the very large and valuable collections of Chinese plants accommodated in the store-house is being accelerated. With the post of Assistant for South Africa still vacant the task of determining continuous supplies from the various parts of the Union is exceptionally arduous.

As naming and “laying in” are largely only a means to an end, it is gratifying to record that, in spite of this heavy tax on the staff, the more important constructive work, such as the preparation of monographs and the writing of floras, was continued. The most important departure was the commencement on September 1st of a Flora of West Africa for use in the various West African Colonies, and in this connection the extensive collections of Mr. N. W. Thomas of Sierra Leone were taken in hand.

South Africa was not neglected, and, owing largely to the presence of several South African botanists engaged in floristic research on various parts of the Union, much useful work was accomplished, members of the staff being able to afford material assistance to several of these workers. Central America also received attention, and a critical list of the plants of British Honduras (preparatory to the publication of a Flora) was commenced. Interest in the Balkan Peninsula has been quickened as a result of military operations during the War, and many collections by Army officers and others have been received. A comprehensive work on the plants of this very interesting region is in progress. A number of systematic revisions of

genera were prepared by various members of the staff, several of which have been published in the Kew Bulletin.

Of visitors occupied in the preparation of floras and spending the entire year at Kew in examining material mention may be made of the following :—Mr. H. N. Ridley (Flora of the Malay Peninsula), Mr. J. Burtt Davy (Flora of the Transvaal), Mr. L. A. M. Riley (Flora of Sinaloa, Mexico). Mr. J. S. Gamble and Mr. H. H. Haines, who are completing their Floras of the Madras Presidency and Bihar and Orissa respectively, made numerous visits to the Herbarium. Miss S. Garabedian of the South African Museum has throughout the year been studying the flora of South-West Africa, and Mr. N. S. Pillans of the Bolus Herbarium, Cape Town, spent five months at Kew preparing a revision of the South African species of *Restiaceae*. Professor C. E. Moss of the University of the Witwaters Rand also spent several weeks in the Herbarium studying particularly the flora of the Johannesburg region. A revision of the genus *Sphaeranthus* was prepared by Dr. W. Robyns of the University of Louvain, Belgium, and Miss J. Davison of the Division of Botany, Pretoria, completed a revision of the South African species of *Celastraceae*.

On the cryptogamic side the identification of tropical fungi claimed first attention, those of India and Africa being the most important. With a view to the publication of an additional list of Uganda fungi efforts have been concentrated as far as possible on the fungi of this Protectorate, and most of the Uganda collections now to hand have been named. Mr. C. G. Lloyd of the Lloyd Library, Cincinnati, has been in the Herbarium nearly the whole year engaged in his work of a revision of the *Pyrenomycetes*, and Professor S. Ito of the University of Hokkaido, Japan, stayed for a period of several months studying Japanese fungi with a view to the publication of a new list.

Special attention was given to the preparation of Supplements VI. and VII. of the Index Kewensis in order to make up arrears due to the partial suspension of the work of compilation during the War, and very satisfactory progress has been made. Particular care has been taken to detect and incorporate omissions from previous supplements.

The compilation of the new edition of Pritzel's Index Iconum has been continued, under Dr. Stapf's direction, by the staff employed by the Royal Horticultural Society; and Dr. Stapf himself has continued his work in the Herbarium as editor of the Botanical Magazine.

COLLECTIONS RECEIVED AND DEALT WITH IN 1923.—The number of specimens received is shown in the following table :—

Collections purchased - - - - -	2,571
Collections received as donations or in exchange - - - - -	18,317
Specimens received in small numbers [name-book entries] - - - - -	2,891
Specimens for examination received on loan	1,896

The routine work of the year, which shows a marked increase over the amount of work carried out in 1922, may be summarised as under :—

Specimens laid out and prepared for mounting	25,760
Specimens mounted - - - - -	28,927
Named specimens incorporated in the Herbarium - - - - -	30,305
Specimens distributed as duplicates - -	23,581

The principal collections received are as follows :—

EUROPE.—*Presented* : Britain; Cornwall, by Mr. Edgar Thurston; various localities, by the Watson Botanical Exchange Club (per Mr. J. E. Little) and Mrs. G. Lloyd; British Marine Algae (coll. L. W. Dillwyn), by Mrs. T. Story Maskelyne; Iceland, Vigtholl. Thufra River, by Mr. St. G. Littledale; France, duplicates from Lenormand's herbarium, by the University of Caen (per Prof. René Viguier); Pyrenees, by Messrs. J. Hutchinson, J. R. Matthews and L. A. M. Riley; Spain (coll. F. Sennen and others), by Prince R. Bonaparte; Corsica, by the late Dr. C. J. Forsyth Major; Bulgaria, Varna District, by Mr. B. Gilliat-Smith; Gallipoli (Thrace), by Capt. C. M. Ingoldby and by Mr. R. Kett; Balkan Peninsula, various localities, by Mr. W. B. Turrill.

*Purchased* : D. McArdle, Irish Bryophyta; H. Sydow, Mycotheca Germanica, fasc. 37-41; Dr. W. Migula, Characeae.

ORIENT.—*Presented* : Syria (coll. B. T. Lowne), by Mr. C. E. Salmon.

NORTH AFRICA.—*Presented* : Algeria (coll. Ch. d'Alleizetti), by the University of Caen (per Prof. René Viguier).

ATLANTIC ISLANDS.—*Presented* : Madeira and Teneriffe (coll. J. Forbes), by Mr. C. E. Salmon.

CHINA.—*Presented* : Chihli, by Mr. H. N. Cowdry; Honan, by J. Hers; Chinese Rhododendrons, by the Royal Botanic Garden, Edinburgh.

INDIA.—*Presented* : Kashmir, by Mr. B. O. Coventry; Burma, by Mr. C. E. C. Fischer and Col. W. G. King; Dehra Dun, Almora District, by Mr. R. N. Parker.

*Purchased* : Rev. G. Foreau, Pulney Hills.

MALAY PENINSULA.—*Presented* : Various localities, by Mr. I. H. Burkill.

MALAYA.—*Presented* : Siam, by Dr. A. F. G. Kerr, Mrs. D. J. Collins and the Siamese Forestry Service; Fungi Malayani, cent. 1 and 3 (coll. C. F. Baker), by Prof. W. T. Horne; Java, by the Director, Botanic Gardens, Buitenzorg; Philippine Islands, by the Director, Philippine Bureau of Science; New Guinea (coll. R. Schlechter), by Prince R. Bonaparte; New Guinea (coll. Lederman), by the Dahlem Botanic Garden.



AUSTRALIA.—*Presented* : Victoria (coll. 1860, R. J. Kendall), by the Royal Geographical Society; Grampian Mountains, by Mr. J. W. Andas.

POLYNESIA.—*Presented* : Fiji, by Mr. W. Greenwood.

NEW ZEALAND.—*Presented* : by Dr. L. Cockayne.

TROPICAL AFRICA.—*Presented* : Sierra Leone, by Mr. M. T. Dawe; Gold Coast, by the Gold Coast Forestry Department; Nigeria, by Mr. H. V. Lely; Angola, by Mr. J. Gossweiler; South West Africa (coll. K. Dinter), by the South African Museum; Belgian Congo (coll. F. M. C. Vermoesen), by the Jardin Botanique de l'État, Brussels; Uganda, by Mr. T. D. Maitland; Kenya Colony, by the Nairobi Forestry Department and Mrs. L. M. Langridge; Rhodesia (coll. F. Eyles), by the Bolus Herbarium.

*Purchased* : R. A. Dümmer, Uganda.

MADAGASCAR.—*Presented* : by Mons. H. Perrier de la Bâthie.

SOUTH AFRICA.—*Presented* : Transvaal, by Mr. J. Burt Davy and the Transvaal Museum, Pretoria; Bloemfontein, by Dr. G. Potts; various localities, by the Division of Botany, Pretoria, the South African Museum, Cape Town, and the Rev. F. A. Rogers.

NORTH AMERICA.—*Presented* : Montana and New Hampshire, by Mrs. S. D. McKelvey; California, by Prof. W. C. Blasdale; Santa Catalina Island (coll. E. C. Knopf and L. W. Nuttall), by the Field Museum, Chicago; various localities, by Prof. C. S. Sargent.

*Purchased* : A. H. Brinkman, Alberta.

WEST INDIES.—*Presented* : Trinidad (coll. F. J. Seaver), by Dr. N. L. Britton.

SOUTH AMERICA.—*Presented* : Venezuela, Caracas, by Mr. A. G. Bailey; British Guiana, by the Forestry Department, and (coll. Dr. H. A. Gleason) by Dr. N. L. Britton; Brazil (collected during the Mulford Biological Exploration of the Amazon Basin), by Dr. H. H. Rusby; Uruguay, by Dom M. B. Berro.

GENERAL.—*Purchased* : H. Sydow, *Fungi Exotici Exsiccati*, fasc. 10–11; P. Sydow, *Uredineen*, fasc. 52–57, *Ustilagineen*, fasc. 13, and *Phycomyceten*, fasc. 9; Naturhistorischen Museum, Vienna, *Kryptogamae Exsiccatae*, cent. 27.

NOTES ON THE COLLECTIONS.—Mr. Edgar Thurston, C.I.E., presented additional plants found by him in Cornwall in 1922, and during a visit to Kew incorporated them with his Cornish Herbarium. The British Herbarium formed by Dr. Geo. Lloyd between 1825 and 1843, containing some specimens collected by Sir William Hooker, has been presented, through the good offices of the Bournemouth Natural History Society, by his widow, as

recorded in the *Kew Bulletin*, 1923, p. 189. Mrs. T. Story Maskelyne has presented 390 Algae from the herbarium of L. W. Dillwyn and also some fascicles prepared to illustrate his "British Confervae", which was published 1802-7. The same donor has also given 20 of Dillwyn's drawings of mosses. Various interesting British plants have been received from the Watson Botanical Exchange Club. Messrs. J. Hutchinson, J. R. Matthews and L. A. M. Riley have presented the first set of specimens collected by them during a tour in the Pyrenees. A large collection of Corsican plants was presented by Dr. C. J. Forsyth Major shortly before his death; his collections from Madagascar were received several years ago.

Mr. C. E. Salmon has presented additional Syrian specimens collected by B. T. Lowne, and others from Madeira and Teneriffe collected by J. Forbes and preserved in the herbarium of the late A. W. Bennett. Mr. H. N. Cowdry has sent specimens from the Chihli Province of China. A valuable set of 250 co-types of *Rhododendron* has been presented by the Royal Botanic Garden, Edinburgh.

Burmese plants have been received from Mr. C. E. C. Fischer, Conservator of Forests, and Col. W. G. King, I.M.S., C.I.E. Mr. B. O. Coventry has presented two interesting collections from Kashmir.

Mr. I. H. Burkill has sent collections made in various parts of the Malay Peninsula by Mr. R. E. Holttum and others. Dr. A. F. G. Kerr has continued to make extensive collections in Siam, and has also forwarded specimens from Mrs. D. J. Collins. New Guinea has been represented by Lederman's specimens, presented by the Dahlem Botanic Garden, and by Dr. R. Schlechter's, presented by Prince Roland Bonaparte.

From Australia, in addition to smaller consignments, a collection made in the Grampian Mountains, Victoria, by J. W. Andas has been received from the National Herbarium, Melbourne.

Mr. W. Greenwood has continued his work on the flora of Fiji and forwarded his specimens to Kew. Dr. L. Cockayne has sent New Zealand plants, including many specimens of *Nothofagus*, the forms of which he has been specially investigating.

Tropical Africa has not yielded such an abundance of specimens as in former years, but a greater proportion has been received from the various Forestry Departments, as noted above.

M. H. Perrier de la Bâthie has presented specimens collected by him in Madagascar, and others from the same source have been received through the University of Caen.

Numerous Transvaal specimens have been presented by the Division of Botany, Pretoria, and Mr. J. Burt Davy. The donation from the South African Museum, Cape Town, contained many specimens of *Mesembryanthemum*. The Rev. F. A. Rogers has continued to present specimens from his African herbarium.

Prof. C. S. Sargent has presented North American specimens, some of them from plants grown in the Arnold Arboretum. A



collection made in Santa Catalina Island, California, by E. C. Knopf and L. W. Nuttall, has been received from the Field Museum, Chicago; an account of the botany of this island was published by the late Dr. C. F. Millsbaugh.

Trinidad plants collected by Mr. F. J. Seaver and those collected in British Guiana by Dr. H. A. Gleason have been received from the New York Botanical Garden. Mr. A. G. Bailey has forwarded the collection made by him during a trip to Caracas, Venezuela. The specimens collected during the Mulford Biological Exploration of the Amazon Basin have been presented by Dr. H. H. Rusby. Plants from Uruguay have been bequeathed by the late Dom M. B. Berro.

VISITORS.—About 5,205 visits have been made to the herbarium during the year. Amongst those who have paid frequent visits or made a prolonged stay may be mentioned:—Mr. E. G. Baker, British Museum (African and New Caledonian plants); Mr. H. R. Britton-Jones (Pathology); Mr. and Mrs. A. F. Broun (Sudan plants); Mr. N. E. Brown (South African and South American plants); Prof. A. H. R. Buller, Winnipeg (Fungi); Mr. I. H. Burkill, Singapore (Dioscoreaceae and Malay Peninsula plants); Dr. J. M. Dalziel (Nigerian Flora); Mr. and Mrs. J. Burt Davy (Transvaal plants); Miss M. E. J. Chandler (fossil fruits and seeds); Dr. A. Daniker, Zürich (Ecology); Miss H. Joan Davison (South African Celastraceae); Mr. H. N. Dixon (Musci); Mrs. E. O. Durham (translation of Lehmann's Colombian notes); Dr. F. Evrard, Saigon (Flora of Cochin-China); Mr. W. Fawcett (West Indian plants); Mr. J. S. Gamble (Flora of Madras); Miss S. Garabedian, South African Museum (South African plants); Mr. B. Gilliat-Smith (Bulgarian plants); Mr. W. B. Grove (Fungi); Mr. H. H. Haines (Flora of Bihar and Orissa); Mr. L. Hall (Plant Chemistry); Prof. A. Henry, Dublin (Coniferae, etc.); Capt. and Mrs. Ingoldby (Thracian plants); Prof. B. Issatchenko, Petrograd (Library); Mr. A. B. Jackson, Imperial Institute (Coniferae); Mr. H. C. Javaraya, Bangalore (Indian plants); Miss M. C. Karsten, Amsterdam (Succulent plants); Mr. A. Keuchenius, Java (Thea); Mr. C. C. Lacaita (European and Oriental plants); Mr. C. G. Lloyd, Cincinnati (Fungi); Mr. E. W. Mason, Imperial Bureau of Mycology (Fungi); Mr. J. P. Mead, Sarawak (Dipterocarpaceae); Mr. Spencer Moore (Australian plants); Prof. C. E. Moss, Johannesburg (South African Monocotyledones); Mr. I. Namikawa (Japanese plants); Mr. R. Paulson (Lichenes); Mr. N. S. Pillans, Bolus Herbarium (South African Restiaceae); Mr. O. Posthumus, Groningen (Malayan Filices); Dr. R. Lloyd Praeger, Dublin (Sempervivum); Mrs. E. M. Reid (fossil fruits and seeds); Mr. H. N. Ridley (Flora of the Malay Peninsula); Mr. L. A. M. Riley (Flora of Sinaloa); Dr. W. Robyns, Louvain (Sphaeranthus); Rev. F. A. Rogers (Rhodesian plants); Dr. C. L. Shear, Washington (Fungi); Miss L. Snelling (Botanical Magazine); Prof. R. R. Stewart, Rawalpindi (Flora of Kashmir); Mr. Herbert Stone (Library); Prof. Seiya Ito, Sapporo (Japanese



Fungi); Mr. Edgar Thurston (Cornish plants); Mr. C. B. Ussher (tropical agriculture).

On October the 24th the Prime Minister of the Union of South Africa, Gen. J. C. Smuts, visited the Herbarium.

**A New Book on Coniferae.\***—This work has appeared very opportunely. At the present time a deep and widespread interest is being taken in conifers, yet all the authoritative books at the disposal of students of the family are now very much out of date.

All the introduced species are fully and adequately described in language that can be understood by anyone reasonably well educated in English, without having more than occasional recourse to a dictionary of botanical terms. Nor does this detract in any way from its scientific value, although no doubt it loses something in conciseness. Besides being a descriptive work it attempts a much more difficult and ambitious task, namely, that of enabling the student by means of a system of keys based very largely on vegetative characters to identify the genus and species to which any cultivated conifer belongs.

Whilst a large part of the book is taken up by descriptive and comparative matter a full account is also given of the history, origin and aesthetic or economic value of each species. Abundant cultural information is afforded and the subject of insect and fungus pests, with such remedial measures as are possible, is fully discussed.

Besides the drawings by Miss Lister, the book is illustrated by thirty-two full page plates. It is excellently printed in clear type and well indexed. The arrangement is alphabetical, but it would have been an improvement if the right-hand page had been headed by the name of the genus in process of being dealt with there, instead of "Taxaceae" or "Pinaceae" as at present runs through the whole book.

It would be an ungrateful task to search for and point out minor errors such as are inevitable in a book of this size and class, but as it is a matter which pertains particularly to Kew, we may point out that the date of the introduction of the Ginkgo is wrongly given as 1795. The fine tree which stands near the Conservatory was introduced, according to John Smith in his "Records of Kew", in 1754. It is probably the oldest Maidenhair Tree in the country whose introduction is recorded.

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\* A Handbook of Coniferae. By W. Dallimore and A. Bruce Jackson, A.L.S. London: Edwin Arnold & Co. Price, 42s.